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A METHOD OF TREATMENT OF DEAD TEETH.*

By William Hern, M.R.C.S., L.D.S., Eng.

Mr. President and Gentlemen,—When I decided to make the treatment of dead teeth the subject of a short paper before you this evening, I was not ignorant that a great deal has been written and very much has been said already on the subject, for one has merely to refer to the dental journals of the past, Transatlantic as well as English, to find that the treatment of dead teeth has been a subject which has constantly exercised the minds and consciences of dental practitioners. Some may, therefore, be inclined to consider it too threadbare and over-trodden to be worthy of further consideration. The fact, however, that so much attention has been directed to it in the past, coupled with the disagreeable present fact that scarcely a day passes with the busy practitioner without his being called upon to treat certain of these frequently occurring and troublesome members, shows it to be still a theme of considerable practical importance.

Seeing, then, the subject has such a practical bearing in its relation to us, as dental practitioners, I need not, I think, apologise for bringing it before you.

The method of treatment which I shall lay before you may differ but little, perhaps, in some of its details from that commonly practised by you, except, I imagine, in the *kind* of root-filling, and the *method* of inserting it; so that I must ask for your leniency if I travel now and then on well-known thoroughfares, and refer to familiar manipulative details.

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* A paper read before the Odontological Society of Great Britain.

One of the first questions that we naturally put to ourselves is, "How can I most surely, expeditiously, and permanently save a dead tooth?" I think the answer to this question will be included in that of a second, viz., "What is the cause *par excellence* by which dead teeth are lost to their possessors?" This, I think we shall all agree, is the result of inflammatory action, of a more or less severe character, of the periodontal membrane originated and excited by the putrefactive changes of a dead pulp. I do not deny that a destructive peridontitis may originate from other causes, *e.g.*, by extension from other local inflammations, or even from constitutional states; but in the overwhelming majority of cases the suppurative periostitis, or abscess, which necessitates the loss of the tooth, is due to septic decomposition of the soft tissue of the pulp.

Granting, then, that this is the *origo mali*, our rational treatment, it seems to me, should comprise the *total extirpation* of the pulp, where practicable, substituting for the soft tissue a material which is not prone to decomposition, but rather antagonistic to it; and, in those cases where the total extirpation of the pulp is impracticable, the same lines of treatment would indicate the application of certain antiseptics to prevent putrefactive changes in the small portions of pulp we have been compelled to leave *in situ*. I regard, however, a tooth treated by the latter method as one of which the prognosis is less hopeful than in the case of one treated by the former, and that the chances of success with a given tooth decrease in probability in the ratio of the increase of the quantity of soft tissue unavoidably left in the root canals.

We naturally divide dead teeth into two classes, as differing somewhat in their treatment—

I. Those which are devitalised by ourselves, and in which the pulps as a whole are not in a septic state.

II. Those which have died natural deaths and have subsequently undergone decomposition, so that the pulp canals are soaked with septic detritus.

The difference in the process of treatment of these two classes of teeth is, however, one of degree and not of kind; the latter requiring all the manipulation I am about to speak of as advisable for the former, together with a course of dressing to render them *aseptic*, and to cure fistulous canals which they may have developed.

In both classes, however, I regard the following as three important axioms and principles of treatment:—

I. The opening out of the crown of the tooth in a direct, or nearly direct, line with the long axis of the root.

II. The enlargement, or "funnelling out," of the orifices of the canals at their coronal ends, or openings into the common pulp chamber.

III. The enlargement and opening up of each root canal throughout its whole length, if practicable, by means of flexible flame-headed drills.

I. The opening out of the crown may be accomplished either by enlarging the cavity of decay in the direction of the axis of the root, or, in cases where the carious cavity is situated altogether out of the direct line of the root or roots, by making a *second* opening through the crown. In incisors and canines with interstitial cavities the root canal can often be made freely accessible to our instruments by cutting the coronal third of the pulp cavity obliquely towards the cavity of decay. If the root canal cannot be reached and cleared in this way, it will be better to make a second small opening through the centre of the lingual surface of the crown.

In molars, similarly, with small deeply situated distal cavities it is frequently necessary to make a second opening through the crown, in order to treat the root canals with any degree of thoroughness and safety.

II. The enlargement and "funnelling out" of the orifices of the canals at their coronal extremities is also an item of no small importance, giving, as it does, a clearer view of the canals and increased working space for their manipulation; it also removes any secondary dentine which may be obstructing the orifices of the canals. A pointed fissure bur is one of the best instruments for performing this.

III. The enlargement and opening up of the root canals I regard as one of the most important aids to the successful and expeditious treatment of dead teeth. It results in at least a fourfold advantage:—

(*a*) By enlarging the calibre of the canals it enables the operator to remove more easily and surely the soft tissue contained in them. This end is, moreover, greatly facilitated by the rotating action of the bur itself; for any lingering portions of dead pulp are effectually and rapidly removed by its twisting action.

(*b*) It enables the operator to introduce his antiseptic dressings with greater facility and better effect, inasmuch as they can be passed down to the terminations of the root canals, and so correct any septic influences there; this is all the more important when we consider that mischief always commences at the extremity of the root.

(*c*) It enables the operator with greater ease and surety to fill the root canals.

(*d*) It results in a considerable saving of time, both to patient and operator; for the cutting away and removal of the septic walls of the pulp canals in teeth, the pulps of which have undergone putrefaction, considerably reduces the number of dressings required for a given tooth; consequently visits are saved both to patient and operator.

This enlargement and opening out of the root canal is best performed by the engine, armed with flexible flame-headed drills, possessing rather a coarse spiral thread. The *Morey* and *Gates Cliddcn* drills are those best suited to this purpose—the pointed head of the drill guides the instrument along the canal and prevents any deviation from it, whilst the large spiral thread obviates clogging and returns all *débris*.

It is necessary to use these instruments with the greatest possible gentleness—allowing gentle persuasion to displace all force, working them with an alternate action of cutting and withdrawal; this prevents the burying of the head and consequent liability to fracture (at the neck of the instrument), at the same time that it brings out the *débris*. It is well *before* using the flexible drill, and occasionally *during* the use, to test the depth and direction of the root canal operated on with a blunt-pointed flexible broach.

The teeth are not all equally amenable to the process of treatment thus far described, and may, I think, be divided into two groups, in regard to the probable ease or difficulty or dealing with their canal roots. Under the term *Easy* (or 1st group) I would include all the normally and commonly straight roots with single and approximately round or oval canals. Among these I place incisors, canines, lower bicuspids, upper second bicuspids, palatine roots of upper molars and posterior roots of lower molars, as those teeth or roots which can be manipulated with tolerable certainty.

Under the term *Difficult* (or 2nd group) I would include those roots which are commonly more or less curved, and which contain small and laterally compressed pulp canals, together with those teeth in which the roots are neither constant in number, direction, or position. Among these I place anterior roots of lower molars, buccal roots of upper molars, first upper bicuspids, wisdom teeth, and abnormalties, as those teeth or roots which are most difficult of manipulation indeed, in some, as I have before hinted, it is impossible, on account of the direction or position of the canals, to remove all the soft tissue—consequently the probabilities of success in treatment are less strongly marked than with the former. In treating the anterior roots of lower molars we should not forget the very frequent and almost normal condition of a double canal.

With the canals opened and cleared as described, a recently devitalised tooth is ready for the root-filling. With septic roots, however, a course of dressing is first necessary to correct any lingering septic influences. The most reliable and efficient antiseptic for this purpose is, in my opinion and experience, *iodoform*, which can be used either dissolved in spirit or in conjunction with carbolic acid, glycerine, or eucalyptus, as a menstruum. I am at present unable to say whether mercuric perchloride will supersede iodoform as a root dressing, as I have not yet given it a sufficiently protracted trial to speak decidedly of its merits; it has, nevertheless, one prominent feature to its advantage in the absence of the pungent odour of iodoform, whilst it ranks very high as an antiseptic agent. I shall be glad, however, to know what are the experiences of other members of the Society on this point.

All putrefactive manifestations having been combated by antiseptic dressings, our next concern is to fill the roots. A root-stopping should, I imagine, possess a variety of qualities and characteristics; amongst others, it should be—

1. Antiseptic.
2. Non-irritating.
3. Easy of introduction.
4. Easy of removal.
5. Capable of perfect adaptation to walls of canal.
6. Soft and adaptable to a narrowing and deviating canal.
7. Solid at the body temperature.

These characteristics and qualities are, I think, combined in a root-stopping composed of wax and iodoform, which is introduced into the root canal, while warm, by means of a wisp of cotton-wool on a broach.

The details of this process are as follows:—The root canals, having been previously prepared for stopping, should be dried and slightly warmed by means of hot air from a syringe. A wisp of cotton-wool, of a suitable size for the root canal, is next rolled on an angular broach (being careful to roll the wool tightly on the point to ensure the broach propelling and not piercing it). This being ready, a small piece of wax and iodoform may now be melted on a spatula; and whilst the wax is still hot dip the cotton wisp into it, and immediately carry it to its place in the root canal by means of the broach, and press it into position with soft-tempered canal pluggers. Care should be exercised in melting the wax not to overheat it and decompose the iodoform. About half the length of the root canal should be filled with the wax and iodoform, the rest may be completed with gutta-percha.

Wax may be easily charged with iodoform by melting it to a plastic consistency on a warm slab, and then thoroughly impregnating it with about half its bulk of precipitated iodoform with a stiff spatula.

Such, gentlemen, is the *rationale* of the process which, in my opinion, ensures the greatest amount of permanent success in the preservation of dead teeth; and I shall hope, as the subject is such a practical one, that a good discussion may ensue, so that we may have the benefit of your views on the subject.

I may say, in conclusion, I am not laying myself open to the charge of advocating an untried remedy, inasmuch as I have used it with the best results for over two years.

DISCUSSION UPON MR. HERN'S PAPER ON THE TREATMENT OF DEAD TEETH.

The **President** said the question how best to preserve dead teeth in a useful condition was one which called for the best attention of every member of the profession. The more they studied conservative dentistry, and the more successful they became in the practice of it, the better they would please their patients, the majority of whom never applied for treatment till they were absolutely obliged, and then expected the dentist to make good the effects of their negligence. He should be glad to hear what those present had to say on the subject.

Mr. Latchmore said he could not agree with Mr. Hern in considering a mixture of iodoform and wax the best material for filling roots. He thought also that in Mr. Hern's method of introducing it, the broach with cotton wool round the point would be liable to act as a piston, and force *debris* through the apical foramen, where it would at once set up inflammation. In his opinion gold was a far better material to use. It was moderately easy to introduce, and also easy to extract.

Mr. Ackland said he had not used gold much for root-filling, but he had used the method described by Mr. Hern constantly for some time past, and had been very successful with it. He could fully endorse all that Mr. Hern had said in its favour.

Mr. Humby said the subject was one to which he had given a considerable amount of attention. He thought the wax and broach would act as a piston and force *débris* and air through the apex of the canal, and thus set up fresh mischief. Mr. Hern had spoken of "dressings," but did not say how many were required. He found that he could treat such cases at one sitting. The essential points were to thoroughly get rid of the septic condition and remove all traces of moisture. His plan was to clean the canal carefully with cotton wool and spirits of wine, and then to inject cold air up the root for twenty minutes, until the tooth substances became white instead ot slate-coloured; having thus got the canals thoroughly dry, he proceeded to insert a permanent filling. He did not know whether Mr. Hern claimed any originality for his use of wax as a root-filling, but he (Mr. Humby) had certainly seen melted paraffine recommended for this purpose, he thought by an American dentist, two or three years ago.

Mr. S. J. Hutchinson said he believed Mr. Charles Tomes had suggested the use of paraffine for root-filling, in the *Journal of the British Dental Association*, two or three years ago. He injected it into the canals by means of a hot syringe.

Mr. R. H. Woodhouse said he was very grateful to Mr. Hern for having prepared so good a paper at very short notice. He thought that most of Mr. Hern's observations and suggestions would be endorsed by those who had had much experience of the operation referred to. For instance, his statement that its success chiefly depended on the extent to which the root canals could be cleaned and filled was quite in accordance with ordinary experience. The palatine roots of upper molars, which were easily filled, as a rule, gave no trouble; whilst the buccal, which were not so easy, appeared also to require more treatment. He understood Mr. Hern to say that in certain cases he would cut away the crown of a molar for one-third of its extent, in order to obtain better access to the root canals. He (Mr. Woodhouse) thought it was preferable to make a tap-hole in the centre of the crown; this did not impair the strength of the tooth, nor did it diminish its usefulness. The plan he usually adopted himself, after carefully cleaning the canals, was to pump in carbolic acid and phosphate of zinc, about 1 to 3, by means of a little cotton wool on a fine broach. He filled the canal with this for about half its extent, and the rest with gutta-percha, and had obtained very satisfactory results by this means. He supposed that Mr. Hern did not, as a rule, enlarge the canals except in the case of teeth with decomposed pulps.

Mr. Hern, in reply, said there could be no danger of forcing *débris* through the apical foramen, for he was always very careful to remove the whole of it, and get the canals quite clear before he attempted to fill them. As to the danger of forcing the wax through the foramen, he would suggest that Mr. Latchmore should try a few experiments with teeth out of the mouth. He would then find that it was impossible to get the wax to pass the foramen unless the tooth was hot and the wax quite molten. Under ordinary circumstances, although it was introduced hot, it became plastic before it arrived at the apex of the canal. As to air being driven out before the filling, he did not think that a small quantity of air impregnated with iodoform was likely to do much harm, and as a matter of fact no harm did result. It appeared to him that gold was of all materials the most difficult to use as a root-filling, and the most difficult to remove if this should be called for. If drilled out, the operator scarcely knew whether he was penetrating the gold or the side of the canal. In reply to Mr. Humby, he thought that iodoform was more to be depended on as an antiseptic in these cases than carbolic acid; its effects seemed to be more permanent. The time required for treatment depended entirely upon the character of the tooth and the nature of the case. Mr. Humby must take a long time over his own cases, if he always followed out the lengthy process he had described. He (Mr. Hern) had not found it necessary to be so very particular about removing the least traces of moisture. He did not remember to have seen Mr. Charles Tomes's paper on the use of paraffine for filling roots; he himself had treated dead teeth in the way he had described since November, 1883.

THE SENSIBILITY OF DENTINE.*

By C. A. Barstow.

Mr. President and Gentlemen,—It is our daily experience in the operating room to meet with patients whose teeth are in that condition which we describe as "sensitive," that is to say, if any attempt be made to excavate any carious cavity in those teeth, the patient will instantly cry out with pain, or at the least flinch from the excavator, and will most likely tell you that "you are touching the nerve," although in some cases you may only be excavating immediately beneath the enamel. This sensation varies greatly in different patients; some teeth will scarcely show any signs of sensation at all, and one may excavate almost to any extent without the patient feeling any pain, while in others the slightest touch of an instrument will produce most acute agony.

That this pain comes chiefly from the dentine is, I think, an acknowledged fact. I have heard it said that enamel may be sensitive, and although I do not deny this, yet I think it is chiefly in those cases in which the enamel fibres at their junction with the dentine are separated, and the dentinal tubes protrude from the dentine and fill up the spaces thus formed; then when the enamel is cut with a chisel or a bur extreme sensitiveness is felt. That enamel is alive I am quite prepared to think, but it is very rarely that one meets with a case of true sensitive enamel. Salter, in his "Dental Pathology and Surgery," states that "there is every reason to believe that enamel is *totally* destitute of vitality." I can quite understand also how the enamel may act as a conductor in conveying heat or cold to the dentine. Now if a piece of enamel be broken away from the outside of a healthy tooth, the surface immediately beneath this is extremely sensitive either to heat or cold, or to the touch of any instrument, also to anything either very sweet on the one hand or salt or acid on the other ; even the slightest pressure of the tongue will cause pain, and it is a fact of every-day observation that we find after removing from a carious tooth the affected portion of enamel, we come upon this sensitive layer, and it often gives us great trouble. It will be noticed that in caries we meet with a variety of colours in the dentine, and it will be found that the degree of sensation is generally in proportion to the colour, that is to say, those teeth, the dentine of which is light in colour and soft in texture will be found to be most sensitive, and those teeth having dark, in fact almost black, dentine, which is very hard, will be found almost free from any sensation. There are, however, exceptions to this rule. Occasionally we meet with one particular spot in a tooth which is more sensitive than the rest of the dentine ; or the sensation may be uniform throughout the cavity. The teeth of the same person may be more sensitive at one time than at another, due no doubt to the condition of the general nervous system, and those teeth which decay most rapidly are usually the most sensitive. If one part of a tooth may be said to be more sensitive than another it is the neck, where the enamel and cementum overlap ; the reason of this I will endeavour to explain further on. Patients of a generally nervous temperament usually have very sensitive teeth ; those of a sanguine temperament vary, some being particularly sensitive, while others do not seem to feel anything. Before dealing with the cause of all this sensation, let me mention two other peculiarities of sensation in dentine ; I refer to cases of Erosion and Abrasion. In Erosion we find the anterior surfaces of the upper incisors presenting the appearance of having had an elliptical piece cut out close to the gum edge ; the cavity thus formed is shallow, and the surface highly polished. It is to be observed that in these cases the dentine is nearly always acutely sensitive to the touch of any instrument or to heat or cold. In Abrasion, where teeth are worn away on their grinding surfaces through biting edge to edge, and the dentine thereby exposed, a process is set up in the tooth whereby secondary dentine is formed and the pulp is thus protected and sensation will be found to be very slight.

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* A Paper read before the Dental Hospital Students' Societies.

The teeth of young persons are far more sensitive than those of old ones. Temporary teeth are as a rule also more sensitive than permanent ones, for the reason that pulps of temporary teeth are large in proportion to the teeth themselves and consequently nearer the surface of the tooth. In the teeth of old persons, the dentinal tubes at the periphery of the dentine are generally obliterated, for, as Dr. Beale states: the hollows of the tubes are largest nearest the pulb, and smallest at the periphery of the tooth, or in other words, at the oldest part, calcification still slowly going on even in advanced life and leading to the peripheral obliteration of the tubes. The pulp cavities in these teeth also lessen by deposition of secondary dentine or the pulp may shrivel and degenerate, the arteries and veins become indistinguishable and their coats are kept rigid and distended by irregular calcareous depositions upon them, the nerves degenerate also, thus putting an end to all sensation.

Many theories have been promulgated in explanation of the sensibility of dentine. Taft, in his "Operative Dentistry," looks upon it as being true inflammation, but in this I cannot agree, for I think rather that it is more a normal condition of a tooth than otherwise,and moreover we have but one symptom of the four so typical of true inflammation, viz., pain, heat, redness, and swelling all being absent.

Magitot states that he has satisfied himself that the nerves of the pulp become continuous with the branched, somewhat stellate cells which form a layer beneath the odontoblasts, and through the medium of these cells with the odontoblasts themselves, and as Mr. C. S. Tomes says :—" If this view of their relation to the nerves be correct, the sensitiveness of the dentine would be fully accounted for without the necessity for the supposition that actual nerve fibres enter it for the dentinal fibrils would be in a measure themselves prolongations of the nerves. Mr. Tomes also states, "There can be no question that the sensitiveness of dentine is due to the presence of soft organised tissue in the tubes, and is not a mere transmission of vibrations to the pulp through a fluid or other inert conductor. The peripheral sensitiveness of a tooth can be allayed by local applications which it would be absurd to suppose were themselves conducted to the pulp ; moreover it is within the experience of every operator, that after the removal of a very sensitive layer of caries you often come down upon dentine which though nearer to the pulp is far less sensitive, a condition of quite inexplicable, except upon the supposition of a different local condition of the contents of the tubes. Naysmith, in his work on the teeth, asks what is the cause of the pain, and follows this by saying, "The ivory (dentine) contains numerous fibres of animal matter, composed of the nuclei of cells arranged in linear order, and these must be the agents of transmission of sensation ; although it must be admitted that no direct communication can be discovered between them and the nervous filaments." Salter gives the following explanation regarding the extreme sensitiveness beneath the enamel. He states that the outer layer of dentine is often imperfectly calcified, and that some of the tissue here remains soft and more impressible ; for it is found that the same exalted sensibility is displayed when the surface of any calcified dentine is acted on by acids and also in pale soft decay.

Mr. Coleman gives no explanation beyond the generally accepted one, viz., that the dentinal fibrils of Tomes are the cause of the sensitiveness.

It is our American *confrére* Bödecker who gives us the greatest insight into the minute structure of a tooth and the arrangement of living matter therein.

In the *Dental Cosmos*, vol. xx., 1878, there is a paper entitled, "The Distribution of Living Matter in Human Dentine," and I think the views here expressed will explain the cause of all sensation that we may find in dentine. Speaking of the structure of dentine, Bödecker says, "each canaliculus," *i.e.* in dental tube, "contains a fibre. These fibres when viewed with a power of 500 on good chromic acid specimens, exhibit a pale-gray colour, and run through the midst of the tubuli without ramification to the surface of the dentine." The outlines of the fibres present a fringed appearance, and in specimens treated with chloride of gold, the fibres and their offshoots show a distinct violet colour characteristic of living matter within protoplasmic formations. The space between the fibre and the wall of the canaliculus remains unstained, and the basis substance between the tubuli only assumes a slight violet tinge.

In the other sections examined with high powers from 1,000 to 1,500 diameters (immersion lenses), Bödecker finds the dentinal tubes running in a wavy course through the basis substance or matrix and bifurcated as a rule only on the periphery of the dentine. Each tube contains a central slightly beaded fibre which sends delicate thorn-like elongations through the light space between the central fibre and the wall of the tube.

The smallest thorns spring in an almost vertical direction from the dentinal fibre while somewhat larger offshoots may run obliquely through the basis substance, and directly unite neighbouring fibres with each other in the vicinity of the enamel and cementum. The basis substance shows a net-like structure, which is formed by the light spaces around the dentinal fibres, sending delicate elongations into the basis substance, in which through repeated branching a light network is established. The meshes of this network contain the decalcified glue-giving basis substance.

"The dentinal fibres are either in direct connection with coarser offshoots of the protoplasmic bodies of the cementum, or the light network of the basis substance of the dentine is in connection with that of the basis substance of the cementum."

Where the dentine is in contact with the pulp, the dentinal fibres directly communicate with the odontoblasts (John Tomes) in a growing tooth, and with the protoplasmic bodies of the pulp in a fully developed condition where no regular odontoblasts can be seen.

In cross sections the dentinal tubes are visible as round or oblong holes, the centre being occupied by the dentinal fibre.

The periphery of the tube is sharply marked and interrupted by light offshoots leading into the light network, which pierces the basis substance between the canaliculi. The dentinal fibres send delicate offshoots through the tubes respectively towards the mouth of the light interruptions in their walls. Bödecker states that in slightly oblique sections he has succeeded, by cautiously changing the focus, in seeing starlike radiated offshoots up to five in number, all arising from a single dentinal fibre. He also says, "towards the boundary between the dentine and enamel, and dentine and cementum as is well known the dentinal canaliculi ramify, and according to their ramifications also the dentinal fibres bifurcate, becoming thinner the nearer to the surface of the dentine. Both longitudinal and transverse sections of this part of the dentine show details identical with the main mass of the dentine, the only difference being that near the periphery of the dentine the fibres are more delicate and more closely packed together." 5

This, I think, fully accounts for the extreme sensitiveness immediately beneath the enamel and also at the neck, in fact, anywhere at the periphery of the dentine, for we know that most sensation is felt at nerve terminations and this is really what dentinal fibres are.

The interglobular spaces on the periphery of dentine Bödecker considers as remnants of the embryonic condition of the dentine. They sometimes contain protoplasm and the dentinal fibres enter the protoplasmic bodies, each fibre being united with the network of the protoplasm by delicate thorn-like projections. Bödecker also goes on to show that the dentinal fibres also become continuous with the lacunœ and protoplasm of the cementum. He says, "The connection between dentine and cementum is established either by a gradual change of one tissue into the other without a distinct line of demarcation or there exists a boundary formed by a more or less marked wavy line presenting irregular bay-like excavation, filled by a substance of the structure of cementum.

A peculiar phenomenon may be noticed in a tooth from which some part, say one-eighth inch, of the pulp has been removed. If the dentine at the upper surface of the tooth be cut with an excavator it may be found to be sensitive although its immediate connection with the pulp has been cut off. This is explained quite easily by the fact that the dentinal fibres inosculate with those lower down in the tooth and thus sensation is kept up. If the whole pulp be removed then sensation in the dentine will be practically at an end, although instances have been known were sensation was felt and this can only be explained by the theory of Bödecker, viz., that the dentinal fibrils are in direct connection with the protoplasm and nervous structure of the periosteum. Having then dealt with the cause of this sensibility the next thing is how are we to overcome it?

Many methods have been tried and many drugs have been used to get rid if possible of this trouble. The first thing to do in cases of sensitive dentine is to put on the rubber dam and perfectly dry out the cavity either with a little alcohol or what is better, hot air. It will be found that hot air frequently applied will lessen the pain considerably, but besides this it is as well to mop out the cavity with strong carbolic or chloride of zinc. A great secret of success in treating sensitive dentine is the use of a sharp excavator; a blunt excavator scrapes and causes pain, whereas a sharp one cuts and removes the softened dentine far more easily and with less pain to the patient. Sometimes cutting the dentine, in one direction will cause pain, whereas if you cut in the opposite direction, very little pain will be felt. Arsenious acid has been used to allay the sensibility of dentine, but its results are not at all encouraging as in many cases the pulp of the tooth has been destroyed; therefore do not use arsenious acid for this purpose. Lead foil has been found serviceable, though I should think tin foil preferable. The latter is often used for lining a sensitive cavity previous to the insertion of a gold filling, calcium chloride has been recommended, a piece being placed in the carious cavity and covered instantly by a piece of wax. It should be allowed to remain a quarter-of-an-hour or longer, or if the operator wishes, until next day. The application causes a little pain, which, however, soon subsides. Insensibility due to irritation by acids, it is said that chalk powder placed in the cavity and sealed with wax has a beneficial effects. Oil of cloves and Carbolic Acid in equal parts has a remarkable effect in diminishing the sensibility. Extreme sensitiveness often arising from erosion may be allayed by the use of Camphorated chloroform, or what is recommended by many, though a rather painful—a hot burnisher rubbed on the surface of the dentine. Mr. Hutchinson, in his lectures on Dental Surgery during the past summer session, related a case of a broken central incisor in a child twelve years old. The dentine was very sensitive, and he applied glycerine and tannin daily for some time with very satisfactory results. Mr. Coleman recommends creasote, or acointe, or

Rec.—Acidi tannici xiii.
Aetheris xi.

applied on cotton wool and changed two or three times daily. An application which I have found most useful is carbolised resin as sold at the depots. A little of this applied on a small pledget of cotton-wool sealed with a gutta-percha filling and left for a day or two will produce a marked effect on the sensibility. Besides these numerous remedies we have temporary fillings either of carbolic acid sealed with cotton-wool and mastic, or a gutta-percha filling either alone or over a small carbolic dressing. The oxy-phosphates and oxy-chlorides also form valuable aids in our treatment of this sensibility. They are usually left in the tooth from six to twelve months according to the degree of the sensibility.

Amongst the latest remedies is cocaine, but as to its value I can say very little accounts ; very greatly respecting this drug, and one may see different effects in different individuals. In papers which I have read on the subject, one operator will give a number of cases in which it was in every way a perfect success, and the next account will probably say that the operator found it no use whatever, and the experiences of some of our own surgeons lead me to think that cocaine has not yet shown any great superiority over our more reliable carbolic. For the benefit of those who wish to try it I may say that it may be applied either as a 20 per cent. solution with oil of cloves, $\frac{1}{6}$ drachm, or as the muriate, either in aqueons solution or in the form of the crystal. The citrate has also been introduced in the form of paste. The cavity is washed with a stream of warm water, and swabbed out with chloroform until perfectly dry, the decay is removed until sensitive dentine is reached, and the citrate paste is then applied. After two or three minutes, if the dentine is still sensitive, more cocaine must be applied. The oleate dissolved in any fixed oil in proportion of 5 to 10 per cent. is also used. Mr. C. S. Tomes mentions a method of using zinc chloride which he finds yields satisfactory results. "A small fragment of cotton-wool is teased out till it is very thin and mixed up in some very fluid oxy-chloride, then put into the tooth and left to harden there, just as though a dressing of gum sandrac were being applied. Zinc oxy-chloride, even when mixed up thick, contains some little free zinc chloride, and when used very fluid (which we are enabled to do by incorporating a little wool with it), there is an ample amount of the free salt to allay the sensitiveness of dentine. After the lapse of a few days, this dressing, which does not cause so much pain at the time of its application as that of the pure salt is removed, and the tooth is then usually absolutely insensitive of the touch of an instrument.

Added to the above remedies is menthol which I think will become a rather useful application. After cleansing out the cavity with cotton-wool, place a crystal of menthol on another piece of wool and apply this to the sensitive part, leaving it there a few minutes, then proceed to excavate. Menthol mixed with rectified spirits of wine and oil of cloves in the following proportions, will be found of good service :

Rec Menthol gr. i.
Spt. vini. rect. mj. i.
Olei Caryoph. mj. x.

This, I think,gentlemen, brings me to the end of my paper, and in conclusion, let me thank you for your kind attention. It only remains for you to have a good discussion, and I trust we shall each go away considerably benefitted by this evening's meeting.

THE MISSING INCISORS IN MAN. WHICH ARE THEY?

(*Concluded from page* 1122.)

By H. H. Edwards, D.D.S., of Madrid *.

There is an interesting article in the *Cosmos* for September, entitled, "Heredity and Development of the Teeth," by Dr. Alton Howard Thompson, which will bear careful reading. Although the "missing incisors in man" may or may not have been in his thoughts, I may be permitted to quote somewhat relating to that subject. He says, "The suppressive effects of disuse as affecting development of the teeth through heredity and variation, are also to be noticed. In no class of organs are the inherited effects of variation due to the influence of changed conditions so marked as in the teeth of man. Being thus susceptible to the effects of active employment or of neglect, they have, by the protracted operation of disuse weighing upon them and retarding their production for generations, become, as one of its effects, so defective and incomplete as to approach the condition of rudimentary organs. The active employment of an organ makes demand upon the nutritive powers for its growth and strength, which is responded to by increased nutrition and added strength by those powers; and use gives an impetus to transmission, which causes that organ to be well and strongly developed in the next generation. But disuse furnishes no stimulus to either nutrition or transmission, nnd the organ so affected is produced as a tradition due to the stimulus of past generations, when it was in active employment, but owing to its disuse in recent generations, it is weak and ill-formed; it has not the necessary stimulus either for development or strength. Not only that, but an organ that has fallen into disuse and neglect, becomes deleterious and injurious, and is, by a natural process of economy of growth, deprived of nutrition, that it may be suppressed and aborted. The remains of many such organs linger in the organisation of man as rudiments of former organs which served a useful purpose under different modes of life; but the conditions of life being changed by new environments, these organs became useless, then injurious, and were gradually suppressed by the law of economy of growth. Such organs the teeth of man are rapidly becoming. Indeed the wisdom teeth have already arrived at that stage in their career of suppression, when they are little more than rudiments. They are never well organised, are often rudimentary in form, and often totally absent, either through failure to erupt or development. The wisdom tooth in the race is departing, and we are the contemporary witnesses of the act of its abolition as a useless organ. Will the second molar follow it in time, and then the other teeth in more or less regular succession? We do not know, we only speak of what we observe. But we do know that all the teeth are defective in form, and deficient in structure, in most of the individuals of the luxurious races of man."

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* A paper read before the Odonto-Chirurgical Society of Scotland.

He does not appear to have noticed particularly the suppression of the lateral incisors, but only mentions that of the third molars. I will refer to the third molars later on.

Dr. Thompson also quotes M. Topinard (Anthropology), who says, "The most remote ancestors have their share in forming the individuals, as well as the immediate parents. In atavism, the reappearance of character is a matter of chance, or rather there are in the germ latent powers, which are awakened into activity by favourable influences."

Also he quotes Dr. Norman W. Kingsley, who says, "It is a most wonderful subject for contemplation, that at some remote period in the history of our progenitors, when nature departed from the normal type, to produce, say, a deformed lateral incisor, a twisted cuspid, or to suppress a lateral, or a third molar, that following down the line of descent we find precisely the same peculiarity, appearing and reappearing in the same line, and again not in the line, but in different branches of the family."

Of course if we ask for a reason why nature interferes with existing laws to present us with a past specimen of her handiwork, we shall get no satisfactory response. In answer to an article of mine recently published in the *Dental Practitioner*, U.S.A., Dr. Dwight Ingersole says, among other good things,—"The reason why nature permitted physical laws to interfere with the laws of the organic kingdom has been asked for a thousand times, but no satisfactory answer has ever been given, because there is no reason for anything that has been brought into existence, the action of law. Nature seems to be blind and deaf to reason, and is arbitrary in all her ways. A reason was never given for anything until man came endowed with reason, and since his advent nature has seemed to be perfectly contented in allowing him to manifest the little he has, in his own way." I may add that there is great truth in the foregoing, notwithstanding its terseness.

Well, then, if nature stands aside and leaves us to reason these things out, being content only to present us with the enigma, our duty evidently is to stand in the breach "á l'outrance."

The question before us concerns the incisor teeth, but if I may be allowed to make a short digression, I would like to say a word about the molars. How many molar teeth did pre-historic man possess? Our nearest kinsfolk, I presume, by the law of evolution—if accepted—are the Simiadæ, of which there are three families, namely:—1, Arctopithecini; 2, Platyrrhini; and 3, Catarrhini. Now, these worthy kinsfolk—begging the pardon of any susceptible gentleman present—though their incisors are the same in number as our own, they somewhat differ with regard to the number of their premolars and molars. No. 1 possesses 3 premolars and 2 molars; No. 2 possesses 3 premolars and 3 molars; No. 3 possesses 2 premolars and 3 molars, on either side, above and below. I mention this for the following reason:—Some ten years ago I extracted a tooth—supernumerary, of course—from the mouth of a woman in the west of England, that had the appearance partly of a bicuspid, and partly that of a molar, but very small. It had erupted buccally between the second and third molars on the right side of th upper jaw. As it is an undisputed fact that the third molar is being suppressed, and in everyday practice I see numbers that are little more than rudimentary, it may be that the third premolar has been suppressed. One case is not sufficient to prove anything, but if there are other gentlemen who have met with similar cases, I would like very much to know their opinion. Certainly it would strengthen materially the theory—if so be there is a theory—of the suppression of outer thirds, namely :—The third molar, the third premolar, and the third incisor. Whoever has noticed the jambing and difficult eruption of the lower third molars that so frequently takes place, must also have remarked a shortening of the jaw itself, at its posterior portion. The law of economy of growth will not admit of superfluous organs, or parts of organs, therefore if the third molar are to be suppressed, the jaws will shorten in consequence ; or if the jaws take the initiative, then the molars must be crowded out.

Now let us return to the incisors. If so be that prehistoric man possessed six incisors, the question is—which pair or pairs have been suppressed ?

At the outset, I think it is of vital interest that the period of eruption of the supernumerary teeth should be carefully recorded. I have never been fortunate enough to see a supernumerary tooth during the process of eruption ; it would doubtless be of use in ascertaining to which type it belonged, and serve as useful data, so that we might reasonably fix the succession in which it originally erupted. If, by the law of atavism, the suppressed tooth appears, its appearance by the same great law should take place in its original succession. We know that the central incisors erupt at the age of 6—8 years ; the lateral incisors, 7—9 years ; and the first bicuspids from 9—10 years. Therefore, if the supernumerary tooth be of the lateral type, it should erupt between the ages of 8—10 years ; if, on the contrary, it be of the central type, according to the position in which we place it, namely, as a suppressed *central*, it should erupt between 5 and 6 years of age ; while, if a lateral following the central type, between the ages of 6 and 8 years.

I have no doubt that some gentlemen will take exception to my fixing a date for the eruption of supernumerary teeth, and may with fairness say, that if in form these teeth are erratic, their eruption may also be erratic, and, therefore, cannot form a reliable basis.

And now for a "new departure." Since having my attention drawn to this subject by Mr. Wilson's paper, I have differed somewhat in my mind from his views, and am more inclined to look upon the supernumerary tooth as being a rudimentary *central.*

The incisors are the teeth of prehension, and the centrals naturally are the most prehensile; therefore, if suppression has taken place through disuse, I infer that the original centrals would be the first to disappear. That the present lateral incisors are *now* being suppressed is not denied. But why? Because the present centrals still find sufficient employment to warrant their continuance, whilst the laterals are becoming more and more superfluous. In about 25 per cent. of my patients, I find the central incisors separated, while the lateral incisors of 50 per cent. possess cutting edges inclining more towards the canine arc than following the central cutting line. As a curious coincidence, whether arising from observation or professional direction, the manufacturers of artificial teeth are making their lateral incisors every day more and more like unto the happy medium between centrals and canines, namely, with rounded corners; they profess to have made them from impressions taken from the natural teeth, and in practice, whether for pivoting or plate making, that is the class of tooth I mostly use. It may possibly be a peculiarity possessed by the Spaniards, but, as I say, I find a goodly percentage with spaces between the centrals, the centrals small in comparison with the canines and molars, and the laterals possessing the intermediate form between centrals and canines, even to the labial longitudinal ridge. The above observations being forced upon me daily, with an occasional supernumerary tooth or teeth in the medium line or space, as in cases Nos. 1, 2, and, perhaps, 3, make me strongly inclined toward the idea, namely, the suppression of the original *centrals* from generations of disuse.

Of course, this is only surmising, but I would present the idea, with the view of widening the field of vision. We know that a solution sought for is invariably found, provided we wish that particular solution to *be* found ; if a man wants a particular cause in order to explain a particular lesion, he will generally adopt that one which appears right to him, and work hard at his proofs, not deigning to accept any innovations. It is partly with the idea of averting such a catastrophe that I have presented the possibility of the supernumerary tooth or teeth as being suppressed *centrals.*

If the idea—mind, I assert nothing—brings forth good fruit in the shape of a thoroughly useful discussion of the subject, I shall be satisfied ; often a dissenting voice will either clench the accepted idea, or it will set men thinking of other possibilities.

On such meagre evidence as we possess, it is the wildest folly to found a theory ; all we can do is to collect facts that will enable the next generation to form a firm basis. Facts, gentlemen, facts ! Let all collect, accumulate, and register them in such quantities, that when *we* are gone there may be no excuse for the coming physiologist to taunt us with idleness or indifference.

In conclusion, gentlemen, I would earnestly impress upon all professional men, especially those whose practice commands the care of children's teeth, as in dental hospitals, to watch the development of these supernumerary teeth, and to carefully record all such cases that come under their notice.

British Journal of Dental Science.

LONDON, JANUARY 1, 1886.

THE NINTH INTERNATIONAL MEDICAL CONGRESS AND THE DENTAL PROFESSION.

Although we have more than once had to call attention to the Congress which it is proposed should be held in Washington in 1887, there yet remain certain points which we feel bound to emphasize. In our contemporary, the *Independent Practitioner*, very rightly and properly notice was, some short time since, taken of the proposal to cut the work of the Oral Section out of the programme of the Congress. As we pointed out upon a former occasion, an omission of that sort could not fail to cripple the whole machinery of the Congress, the more so as it had been already severely strained by the secession of so many of the leading spirits in the medical profession in America. It is urged that no such omission was really ever intended. In the columns of the *Journal of the American Medical Association* we read that the re-organised Committee merely contemplated an affiliation of the Dental and Oral Section to the Surgical Section and were compelled to this step by the exigencies of failing to find sufficiently ample accommodation for so many Sections in session together. We willingly accept the explanation, but at the same time feel bound to point out such a scheme must have proved most pernicious alike to the parent and affiliated section. In a mixed section, such as that devoted to Surgery must necessarily be, it would be absolutely impossible to give the time and attention to the very special work which Dental Surgery demands. And then again, not only does dentistry demand surgical methods and appliances but includes a system of Medicine of Therapeutics coupled with a wide and ever increasing Materia Medica, which could not be appropriately included in the debates held by surgeons in a section devoted to surgery. And even now that the Section of Oral Surgery and Dentistry has been replaced upon the list of sections, we cannot but feel that it will need very great care and skill on the part of the officers to ensure the success of that section. It is not for us to inquire at present how far English surgeons and dentists are prejudiced by the "split" which has occurred in America with regard to the arrangements for this Congress. We heartily deplore the line of conduct which has led to this division of feeling in America, but we cannot close our eyes to the fact that its moral effect upon the profession in England has been very great, and unless the most strenuous efforts are made its seems more than probable that there will be an abstention on the part of many, if not of all, the best known men in England. Now such an abstention would of course seriously imperil the success of the Congress, since it would take away the character of universality from it. However, we believe that so untoward a result could be prevented if our American *confrères* would realise the position and make it apparent to the profession over here, that it is intended that this Congress shall be truly representative of the best and most leading luminaries of the profession in America. Whether or no the circular which has been issued to us proves this to be the fact we will not debate, we will simply urge the fact that very many English surgeons and English dentists will hold aloof, because they imagine, rightly or wrongly, that the Congress has been frowned upon and spoken lightly of by leaders on both sides of the Atlantic.

The attendance at a Congress so far away will involve a heavy expense and loss of time, and men will not be ready to incur such a loss unless they are well assured that they are adopting a course not out of touch with their friends on both sides, and further. one which will not in the end land them in the predicament of having gone through a great deal to gain very little. At present the leading members of the dental profession in England have not committed themselves to an opinion, and it is unquestionably highly important that steps should be taken to gain their sufferances. We have yet to learn the sentiments of the British Dental Association upon this point, but we opine it will be little out of harmony with our own. Were it possible that some authoritative body, say the leading dental society in England, could give us some expression of its opinions it would certainly serve alike as a guide for practitioners and would prove some sort of a guarantee that a united and not a spasmodic and isolated action would be taken in the matter by the body of English dentists. There are so very many questions which could with advantage be threshed out by Americans and English met together in conclave, that it behoves us all to do what we may to carry out, if possible, a conjoint action with regard to the Congress. It is a subject upon which we should welcome the expression of individual feeling among our American and English readers alike. One thing is certain, the matter cannot remain as it is at present : there is demanded imperatively some scheme or line of policy which shall have for its object the placing the American and English leaders in the profession more entirely *en rapport* than they are at the present time. How such a consummation is to be attained we do not at present think we English are concerned, the inviters must, it seems to us, take the initiative, if only in the cause of the profession and science in general.

THE RETIREMENT OF MR. OAKLEY COLES.—The passage of Mr. Coles from among us is to be signalised by the presentation of a Testimonial. Those who have known him longest, have known him best, and have learnt to appreciate his personal and professional good qualities. The proposal to present Mr. Coles with some suitable memento of this important epoch of his life will afford his many friends an opportunity of expressing to him their high regard for him, and their gratitude for the enthusiasm he has ever thrown into his work for the common weal of the profession. Public spirit and the spirit of self abnegation are qualities much needed by our perfession and at no time more than at present. The committee appointed to arrange about the presentation and to receive subscriptions, are Messrs. Royes Bell, Edward Bellamy, Thomas Gaddes, Henry Smith, Dr. Brodie Sewell and Lord Alfred Paget. Sir Edwin Saunders is Chairman, Mr. Charles Vasey, Treasurer, Messrs. J. Smith Turner and William Rose Secretaries.

WHOSE FAULT IS THIS ?—The *Journal of the British Dental Association* says: Still there is no harm in asking our readers to "remember the Benevolent Fund." Some few, at all events, will, we hope, be sending up their annual subscriptions next month, and may, perhaps, be induced to add a trifle for this very deserving object. We are sorry to hear that the Cambridge meeting only added one name—that of Mr. J. B. Bridgeman, of Norwich (£1 1s.)—to the list of subscribers. Mr. D. Dopson' of Liverpool, at the same time increased his subscription from half-a-guinea to a guinea, and 8s. 3d. was found in the collecting boxes. During the four months which have elapsed since the annual meeting nothing has been received !

SALIVARY CALCULUS IN A MEDICAL MAN.—The *Lancet* quotes the case of Dr. de Rato :—When a child the sublingual glands were indurated and painful ; afterwards that on the right side disappeared, but the left gland continued to cause trouble, the pain being felt in Wharton's duct, and there being increased secretion of viscid saliva. These symptoms, however, disappeared for a time. For several years, especially during the later months, pain and inflammation have returned, sometimes extending to the right side. After the acute symptoms have subsided a permanent induration has always remained. Last December Dr. de Rato suffered from a more severe attack of this kind than usual, accompanied by repeated rigors, followed by severe pain and febrile disturbances. Afterwards the inflammation extended, and glossitis and amygdalitis prevented speech and the ingestion of food ; then came a copious secretion of viscid saliva. By the fifth day, when the inflammation had to some extent subsided,a probe passed into Wharton's duct, detected a calculus, which was extracted by forceps the following day. It was of the shape of a date stone, weighed 540 milligrammes (8.37 gr.), and was of the hardness of chalk. Externally it was of a dirty white color with reddish spots, and internally it was white. Since the extraction of the calculus the induration remains, and Dr. de Rato believes there are also small calculi in the duct.

To Disguise the Odour of Iodoform.—The *Dental Register* quotes M. Gellette's formula :

Iodoform	100 parts.
Sulphate of Quinine ...	1 part.
Charcoal	3 parts.

The mixture is well-worthy of trial. We simply quote it for what it is worth, as we have no experience of it.

The Odontological Society of Great Britain.—The next meeting of this Society is proposed to be held on the second and not the first Monday of the month, and so will fall upon January 11th. The main business of the evening will be the election of officers, which will, we understand, preclude the possibility of the formal reading of papers upon that night.

The Dinner of the Past and Present Students of the Dental Hospital of London.—The Editor of the *Journal of the British Dental Association* is informed upon good authority that the date of this dinner has not yet been fixed. The meeting will probably take place early in February, and of course due notice will be given.

Damages against a Dentist.—The death of the patient of M. Duchesne, the French dentist, while under the influence of nitrous oxide gas, has led to a civil trial for damages against the dentist. Besides being mulcted heavily for damages, M. Duchesne was fined for administering the anæsthetic.

Vicarious hæmorrhage caused by inflammation about a tooth.—A case is reported in the *Cosmos*, in which a superior right lateral incisor gave rise to considerable swelling and inflammation in its vicinity. Frequent attacks of epistaxis occurred, one a severe attack, ensuing upon the removal of the tooth. All epistaxis disappeared and did not return again. The patient is said to have been of a plethoric habit, and so the occurrence of vicarious hœmorrhage from mucous surfaces is less remarkable than at first sight would appear.

Abstracts of British & Foreign Journals.

OHIO STATE JOURNAL OF DENTAL SCIENCE.

EFFECTS OF ZYMOTIC DISEASES UPON THE TEETH.

BY DR. F. S. WHITSLAR, YOUNGSTOWN, OHIO.

[Read before the Northern Ohio Dental Society.]

Causes of decay are two-fold, and are predisposing and exciting. When the structure is imperfect they are more likely to decay than when they are perfect. Also the teeth may be comparatively well organized, but owing to defective nutrition, they are more susceptible to decay. The exciting causes have been held to be as a *real* disease, a vital phenomenon, comparable to morbid conditions of other more highly organized parts of the body. Some regard it as the effect of mere chemical action, while some hold it as wholly and entirely the effect of chemical action, in no degree modified by connection with a living organism. The "true disease" theory the writer thinks has been exploded. The first thing as a probable effect of zymotic diseases upon the teeth, is the partial arrest of their development. The crowns of teeth, bearing the marks of interrupted development, instead of presenting the smooth and glossy surface characteristic of finely developed enamel, are disfigured by the presence of irregularly grooved and pitted surfaces, usually accompanied by a considerable diminution of size. The incisors are commonly very thin and compressed, while the cuspids and the cusps of the molars are terminated by sharp points. The enamel and dentine tissues are not only deficient in quantity, but are defective in quality. The enamel will be porous, yellow, opaque, and fragile, while in the dentine that uniformity of size and arrangement of the dentinal tubes, which they exhibit in well developed teeth, are wanting. The defect of structure is limited to such portions of the several teeth as were undergoing development at the same time. Some teeth are marked by grooves and ridges regularly disposed. The grooves are the result of imperfect, and the ridges of perfect development of the enamel and subjacent dentine. These transverse markings result from alterations in the developmental process.

In most cases the ridges, pits, etc., on teeth arise from an imperfect organisation of the teeth, if not the result of some special disease, such as measles, influencing the system generally, is yet consequent upon constitutional conditions.

Hereditary syphilis in it effects, may often be traced as the cause of a peculiar dwarfed condition of certain teeth. The incisors and cuspids are of small size, and peg-shaped; the crowns are notched, the notch being in the main, a concavity from the one corner to the other, though there may be secondary notches in this general concavity. This class of teeth which we note as syphilitic, have a dusky, opaque appearance, and are relatively small. They are of a very soft character, and consequently wear down very rapidly. Moreover it is claimed by the best authorities that constitutional syphilis is capable of modifying the nutrition of many parts of the body, manifesting its influence in attacks on the hair, the nails, and the skin generally. Now the homological relation which exists between the teeth and various dermal appendages, may serve, to explain, that the developing teeth should be a chosen site for its manifestation.

Now what are the effect of zymotic diseases upon teeth which have none of the marks of partial development? All febrile conditions or diseases predispose teeth to decay. 1st. by diminishing vitality. 2nd. by changing the secretions of the mouth so that they act injuriously upon the teeth. In dyspepsia we have not only the predisposing, but also the exciting causes of decay, as it not only impairs vitality, but prepares, in the stomach, an acid that is continually being thrown upon the teeth, which acts upon them with great energy. Residence for any length of time in miasmatic regions, inducing unfavorable conditions, institutes a predisposing cause. And all epidemic, endemic, dietetic, and enthetic diseases derange the functions of the body, vitiate the secretions, impair the vitality, and may be classed as predisposing causes of decay.

WOMAN AND HER TEETH.

By T. Dwight Ingersoll, Erie, PA.

A mother's teeth are sympathetically connected with the reproductive organs, giving her sometimes severe pain during the period of labour.

A case is cited:—A lady, age 32, the mother of five living children, one dead. Terms of gestation are unmarked by anything unusual. Labours last about eight hours on an average. During the last labour, the pain suddenly ceased in my back and womb, but set up in a tooth that had been aching several times during the past nine months. The pain was paroxysmal, coming and going just as it did in the womb. Some cotton saturated with chloroform was put into the cavity. The pain left the tooth to appear in the back and womb; but the effect soon passed off; the pain in a few minutes returned to the tooth, to be again and again relieved by the chloroform. No progress was being made in the labour, and her doctor thought none would be until that tooth was removed. As soon as the tooth was extracted the labour rapidly concluded. Similar cases are cited.

The pregnant condition may not be the only one involving sympathetically the fifth pair of nerves, as it is supposed the teeth are more or less affected in menstruation, and sometimes in the change to puberty. It is believed that "not only pregnancy diminishes the density of the teeth," but according to Dr. V. Gallippe, "this aptitude for dental caries frequently coincide with puberty and is accentuated by each succeeding pregnancy." He and Landouzy attribute this to the lowered degree of alkalinity of the fluids of the body. To satisfy himself that these conditions had a direct bearing on the teeth, Dr. Gallippe made a large series of observations in hospitals, showing that in a majority of cases the saliva was acid. "The elimination of carbonic acid," he says, "is greater in man than in woman; it is nearly double at the period of puberty."

It seems that premature loss of teeth is attributable to evils resulting from civilisation; and an inquiry arises in regard to some possibility of retrieving the loss. As a remedy he suggests some means should be devised to restrain those habits that tend to degrade the mind, and enervate the body. Public sentiment should be awakened and stimulated to exertion in suppressing licentiousness, where legal measures and church influence are inoperative. If suitable measures could be instituted for the prevention of marriage by those who are diseased, it would be a grand step toward human improvement, on the principle of the "survival of the fittest." Before the present free-marriage system can be broken up in favour of a prohibitory one in cases of disease and near-blood relation, general intelligence and scientific principles must be brought to bear on the public mind, until it would feel the importance of favouring any movement or law that would lift humanity to a healthier and nobler plane of life and thought. With a general improved physique and health, there would come a more perfect development of the teeth, and consequently there would be less suffering and decay, as such teeth have a greater power of resistance to whatever tends to their destruction.

Literary Notices and Selections.

SOME OF THE PATHOLOGICAL CONDITIONS OF THE ORAL CAVITY.*

By F. D. Nelles, D.D.S.

In fulfilment of the conditions of the requirements for such a paper as you have asked of me, nothing would have been easier than to have turned to some good pathological treatise and given a classified list of the various diseases having their seat in the oral cavity, of which all of us know more or less theoretically, but which no two would treat exactly the same when the practical case is presented.

To give this assertion more the semblance of a fact, allow me to cite the following examples : A regular patient came to the office one day, asking the cause of a certain prominence located in the maxillary process of the superior jaw. There was no aching, no pain, no redness of the gums, and no inflammatory action apparent. Neither was there any soreness of the incisors over which the fullness was located. Now, what was the difficulty? Let us examine the case a little further. The age of the patient was fifty years or more; the teeth were abraded. Did that mean anything? Might there not be a putrescent pulp in one of the teeth? A brother practitioner happening to be present at the time, and being desirous of ascertaining whether two dentists could agree in tracing effect to cause, he was invited to assist in clearing up the mystery, for as such it must be considered until all doubt was set at rest. That it was something abnormal we were well agreed, but differed as to the mode of treatment. He recommended painting over with a solution of iodine; but why not as well paint the integument of the face, including the alæ of the nose and a portion of the lip, where the fullness was quite visible? The advantage, however, was mine, as the patient had come to me. I announced that we would treat the case heroically, and he, with some astonishment, saw me select a bur of proper size and drill through to the pulp chamber. A free discharge of pus quickly followed, and the treatment thereafter was very easy. That was more than nine years ago, and the tooth now, abraded to the very gums, is still doing good service.

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* Read before the Fifth District Dental Society of the State of New York.

It might be well to observe that a collection of pus, under such circumstances, when unattended with redness, tenderness, and devoid of all inflammatory signs, is said to be either a chronic or cold abscess, yielding a pus markedly different from that which is designed as laudable, it being much thinner and more sanious.

The other case to which I desire to call your attention, was that of a girl about twelve years of age, who complained of two very sore teeth, the inferior central incisors. The appearance of the countenance and eyes was such as invariably accompanies affections of anginous origin. The teeth were not only sore, but loose, and raised from their sockets. For comfort, the jaws were kept well asunder, causing the saliva to run unrestrained from her mouth. The gums were not red nor swollen, but unnaturally light in color. She had received no blow or fall, no injury of a mechanical nature. Now, what could have been the cause of the trouble?

Let us look into the case a little further. Just behind the front teeth lie two little glands—the sublinguals. They were found to be enlarged beyond the normal size, but were free from any inflammatory signs. Such being the case, how could one conscientiously decide that they were the cause of the trouble. A prescription, based upon this supposition, was, however, made: R Ammonii Chloridi, drachms two, water sufficient to make four ounces, to be held in the mouth in teaspoonful quantities several minutes before spitting out, fifteen or twenty times a day until all pain was gone, then to come again.

In about four weeks two little girls came to the office, one to have a tooth extracted. When she had been disposed of I looked at her companion and recognised in her the girl of the sore teeth. When asked why she had not come back the following day as requested, she replied, "Oh, the teeth got well right away," and upon looking I found she had spoken truthfully, as there was then nothing remaining to indicate that the teeth had ever been affected.

I have arrived at that point now, where I hope we shall begin to understand that in treating diseases of the mouth successfully, much of our skill lies in a clear-sighted diagnosis. The oral cavity has been the *open sesame* to most physicians of the past, and will continue to be the object of examination just so long as it supplies a talismanic guide to distinguish the difference between certain kinds of diseases preying upon the human system. If diseases of the general system can be the better established by conditional aspects of the mucus membrane of the mouth for physical practice, why not for dental practice as well? Rheumatism, when it has become chronic, will affect the teeth and gums inversely, as other organs of the body. With this disease we may look for inordinately pale gums and resorption of the alveolar process, deposition of tartar, reaching from the necks of the teeth to the receded gums, an eighth of an inch, more or less. Both upper and under jaws will be affected about alike, and the recession of the gums around the incisors and biscuspids pretty even, showing most on the labial and buccal surfaces. The tartar will be found light in shade, tenacious, and intruding underneath the free edge of the gums. Creamy deposits of food and fatty matters will be found adhering to the tartar. Touched with litmus paper, it will always give an acid reaction. The teeth will be more or less decayed on the labial and buccal surfaces. The treatment will consist in removing the tartar, filling the cavities, and giving alkaline washes for the mouth and teeth. Sulphate of soda, one-half drachm to about eight ounces of water, makes an excellent detergent. One ounce of this solution poured into a cup in which the brush is repeatedly dipped, holding some of it in the mouth while brushing, will thoroughly cleanse the teeth and mouth. It is a little unfortunate, perhaps, that in the treatment of such diseases we have so small a field as the mouth affords to labour in. Had we the power accorded to the family physician, in treating diseases of a general origin that produce such devastating effects upon the teeth, we might in many cases accomplish more pleasing results.

It will never do for us, any more than for physicians, to ignore the fact that the mucous membrane, all of that portion of it which lines the mouth, invites our especial attention. The teeth, although dense and flint-like in structure, are of dermic origin, and derive their nutrition wholly from this source. Is it not natural, therefore, to reason that any disease having its seat in this membrane in more ways than one will affect the teeth? If acute adenomata of the sublingual glands will do this, may we not assume that other glands, if even more remote, may produce similar disturbances? When examining pathological works touching upon this subject, most of them will be found more or less explicit in tracing affections of the mucous membrane from structure to structure, tissue to tissue, until all abnormal changes are traced, save those affecting the teeth. For further knowledge we must turn to dental pathology, where we find much about teeth, and little, too little, about the soft tissues. It is true we now and then get an essay from some bright mind, theoretically advocating that all, or nearly all, diseases of the mouth spring from carious teeth, but another soon comes forward with the argument that all, or nearly all, such diseases arise from calcareous deposits upon the teeth. Still another will proclaim it is neither the one nor the other, but that the material which is put in carious teeth as fillings is the cause of all, or nearly all, the diseases incidental to the mouth. So when we come to prescribe for diseases of the oral cavity, if we trust entirely to the books, we shall continue in darkness.

The gums may be atrophied or hypertrophied, it matters but little which. The inflammatory redness accompanying gingivitis will never be wanting. If, however, an atrophied condition prevails, the treatment will be found comparatively easy, as nothing much will be required but removal of the tartar, found almost invariably free from and above the gums. But this state of things is entirely different when the gums are in a hypertrophied condition. Then the free edge of the gums will be much thickened and operculous. The fibrous attachments running from the tooth membrane to the gums will seem absorbed. Each and every tooth will seem placed in the gums mechanically, with a little dirt of a dark or lightish hue thrown around them, as if in hope that they may some day take root and grow. But a more careful examination will show this to be tartar. The treatment will consist in removing the tartar with alkaline washes, sulphate of soda, sulphate of potash or borax, given in solution, one to two drachms in four to eight ounces of water. Give them singly. Sometimes the potash will do more good than the soda.

A solution of tannic acid with alcohol will sometimes do better in such cases than alkaline washes. One objection to it is, that it will stain the exposed cementum at the necks of the teeth, if kept up too long. Two to three grains of tannin to one ounce of undiluted alcohol will be sufficiently strong. A better formula, however, would be the following :

Tannic Acid, grs. iii.
Alcohol absolute, drachms iii.
Water distilled, do. v.

Add the tannin to the water. Shake, and then add the alcohol. It may be flavoured with two to five drops of oil of wintergreen. This must be dropped into the alcohol previous to adding it to the water and tannin. The manner of using this wash has much to do with its ultimate success. The instructions should be to brush the teeth as usual, with water, rinse out the mouth, and wash out the brush ; now pour on the brush as much of the solution as it will hold without wasting, and go over the teeth and gums with the brush carefully, as if they had not been previously brushed.—*Independent Practitioner.*

STUDIES OF THE PATHOLOGY OF ENAMEL OF HUMAN TEETH, WITH SPECIAL REFERENCE TO THE ETIOLOGY OF CARIES.*

BY FRANK ABBOTT, M.D., NEW YORK, N.Y.

One of the most important questions in dentistry has always been the pathology and etiology of caries. Thoughtful dentists have long agreed that there is a marked difference, not only of individuals, but also of races, in the liability of teeth to decay. Quite recently a prominent dentist of New York directly accused civilization of being the most conspicuous factor in its production. It is an undeniable fact that, with advancing refinement of individuals and nations, decay of teeth is more prevalent. It seems to me, however, that even this recognized fact will not altogether explain the rapidly growing tendency toward this disease under all circumstances. It has many times occurred to me that there must be an anatomical substratum to fully explain the liability to caries in each single individual, aside from the acquired local causes to which caries has usually heretofore been attributed. Unquestionably, there are auxiliary agents in producing or fostering decay of teeth, such as certain kinds of food, more especially sweets, which are too often retained in the fissures always found in the grinding surfaces of certain teeth, upon irregular teeth, uneven surfaces of the enamel, etc. But all these cannot fully explain the fact that the simple change in modes of living should manifest itself in the sudden and rapid destruction of these organs. Strong, healthy individuals, upon being transferred from a country with comparatively simple habits of life into a country of high refinement, may soon become victims of caries of their teeth. Modern Germans and Irish, migrating to America and enjoying luxuries (similar to those enjoyed by comparatively civilized old Egyptians, in whose mummies we observe, not without some surprise, a pronounced tendency toward decay of the teeth), soon discover, to their great discomfort, at least, that their teeth are becoming diseased.

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* Read before the American Dental Association, at Minneapolis, Minn., August 5, 1885.

(*To be continued.*)

Dental News.

ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.

The first meeting of the Session 1885-86 took place on the evening of November 12th, at the Rooms of the Society, 30, Chambers Street—W. Bowman Macleod, L.D.S. Ed., President, in the chair.

After the reading of the minutes and the general business had been concluded, Mr. Macleod rose, and in the following few remarks, acknowledged his election to the Presidential chair.

The President said—In opening the Session 1885-86, you will permit me a few words in order that I may thank you for the honour you have conferred upon me in electing me your President. You will believe me when I say that I feel and appreciate this distinguishing mark of your favour, and that the more when I look back and note the high character and abilities of my predecessors. To rival and excel them I cannot hope ; but I will at least endeavour to so guard the trust you have placed in me that I may be able to return it to you in as prosperous a condition as that in which I received it. If I succeed in doing this it is as much as I, knowing my own shortcomings, can hope to accomplish ; if I do more, to me will not be the credit, but to the energetic support of the office-bearers and council you have given me to assist in governing the society.

Although it has not been the absolute rule, yet it has been the custom for your Presidents to open the Session with an inaugural address. I hope you will agree with me that on this occasion it is a custom more honoured in the breach than in the observance. I felt that most of the general retrospective topics upon which one in my position could with propriety have addressed you had already engaged your attention, that at present there is no subject on the *tapis* which specially affects us as a society, and that the only subject which lies in the future, and upon which I felt I might have something to say, is as yet so immature that to bring it on the carpet at this time would be inexpedient, and therefore unacceptable. Under these circumstances I deemed it better to withhold a speech, as there is nothing more tiresome and profitless than listening to words from a man who has nothing to say. I, however, have not been forgetful of the duties incumbent upon me, and have, with the assistance of our most excellent secretary, been endeavouring to make provision for a full programme at our *sederunts*. As one of the results of that activity, I shall have the pleasure of reading a paper this evening by Mr. H. H. Edwards, D.D.S., of Madrid, which, I am certain, will be much more acceptable than any address I could have presented to you. For our future meetings we have already secured a goodly supply of material, and if this is supplemented by the average number of notes of cases in practice, and other casual communications, we will be able to look back upon a pleasant and profitable session.

The President drew attention to the album of the Society, and urged that those who had not already contributed their cabinet portraits should do so, and that if others who were not present would send theirs to the Secretary, they should be duly installed in their places in the album.

The President then called upon Mr. Lipscomb for a short communication, promised by him, upon "two cases in practice," lately under his treatment.

Mr. Lipscomb said he had nothing new to bring before the meeting this evening, but merely a case or two in practice that he hoped might be found of general interest, and be the means of producing a short discussion. The first was one of the non-eruption of an upper wisdom tooth.

Case No. 1.—A gentleman about 40 years of age called upon him, complaining of a nasty taste in his mouth, especially when he awoke in the morning. He had been troubled for about two years. He found that his health was suffering a good deal in consequence, and that he was getting weaker every day, this condition being, however, associated with comparatively no pain. He had consulted his doctor at intervals during the two years, but with no beneficial results. On examining his mouth, Mr. Lipscomb found his teeth in good order, but the upper left wisdom tooth missing. As the patient then stated that he did not think he had had a tooth extracted from that position, the cause of the trouble was very easily diagnosed, viz., that it was the discharge from this fissure from which he had suffered so long, and which was the occasion of the unpleasant taste complained of. A free incision was then made up to the alveolus, and plugged well up with cotton wool saturated with a weak solution of carbolic acid. He was going to London on business that night, so Mr. Lipscomb directed him to call upon his friend, Mr. David Hepburn, and get the cotton wool renewed, which he did, Mr. Hepburn telling him that he could then just feel the crown of the tooth imbedded in the alveolus. He returned a few days after, and Mr. Lipscomb succeeded, after some considerable difficulty, in removing the tooth, the reasons of which difficulty would be very obvious to any one examining the tooth, as the roots were largely exostosed, and there was the danger of breaking away the posterior wall of the superior maxilla to be borne in mind—a by no means impossible accident, considering the porous nature of the bone. The wound was dressed for a few days with solutions of chloride of zinc and carbolic acid alternately, and a tonic prescribed.

He soon began to put on flesh and gain strength, and has now made a complete recovery.

Case No. 2.—There appears in this month's number of the *British Journal of Dental Science*, a case of replanting, by Mr. G. H. Godwin, of Derby, which is briefly as follows :—He removed a first bicuspid, so as to enable him to extract a second bicuspid stump that had been troubling a medical friend of his, the first bicuspid being replanted after the removal of the stump had been effected, and so far it had been a success.

But surely it would have been more satisfactory if he had left this case for a few years before putting it before the profession, to see that it was going to be a permanent success. Mr. Lipscomb did not himself believe in replanting, although he was about to quote a case that he had had four years ago, and the tooth at the present moment was quite firm, and very serviceable.

A young farmer, aged about 22 or 23, called on him to have an upper lateral extracted. It had caused him great pain for some days. The tooth was very little decayed, but somewhat loose, and the gum inflamed, but not tender. He said that a month or so before he had run against the point of a friend's umbrella, and hurt the tooth, but it had got well in a day or so. Mr. Lipscomb extracted the tooth, cleaned it, and after soaking it in a warm solution of carbolic acid, replaced it, tied it to the central and canine, and sent him away almost free of pain. He called two days after, said he had suffered no pain, and the tooth was getting quite comfortable. A week after, the tooth was comparatively firm, and within a few weeks the thread was taken off, and he has had perfect use of the tooth since.

There were some other similar cases which Mr. Lipscomb had had, but he wished to give them a year or twos' trial before bringing them before the Society.

The first of these two cases was the occasion of some considerable discussion, the general experience being that while impacted lower wisdom teeth were of comparatively common occurrence, the same trouble in the upper jaw was much rarer.

Mr. Campbell said—"About a year ago he extracted, after a good deal of trouble, an unerupted wisdom tooth, the details of which he thought worth mentioning in connection with Mr. Lipscomb's interesting case.

The patient, a lady aged 49, had suffered from neuralgia more or less severely, on the right side of her head and face, for 5 years. For two or three months before she came under his care, her suffering had been very great. She had consulted many medical men, but without relief. He (Mr. Campbell) knew the lady's husband, who spoke to him casually about his wife's great suffering. He suggested an examination of her mouth, which proposition was acted upon, but the teeth appeared to be perfectly sound. He noticed, however, that the right upper wisdom tooth was missing, and from the fulness of the gum, did not seem to have been extracted. On enquiry, he found the patient had never had a tooth removed from the upper jaw. From the symptoms, and the appearance of the mouth in the region of the upper wisdom tooth, he came to the conclusion that this tooth was not erupted, and the probable cause of all the patient's suffering. After consultation with the family doctor, who happened to be an eminent surgeon, it was agreed to put her under chloroform, and examine the state of matters. This was done, and when the alveolus had been cut through, the instrument came upon the enamel of the wisdom tooth. Being now fully assured of its presence, he proceeded to extract it, but never before experienced so much difficulty in removing a tooth from its socket. The tooth in front, and a part of the alveolus surrounding the wisdom tooth, which proved to be extremely dense, was removed, and even then it was with considerable difficulty that the tooth was at last extracted, having to be literally gouged out. The patient of course suffered a good deal for a week or two after the operation, but has since been quite free from pain.*

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* Mr. Campbell has since forwarded to us the tooth in question. It has been slightly attacked by caries, but nothing to account for the serious symptoms exhibited; while on the other hand, as a result of the chronic irritation, the root has a remarkably thick coating of exostosed cementum, terminating at the neck of the tooth in a strongly pronounced fold.—Ed.

The President then read a paper forwarded to him by Mr. H. H. Edwards, D.D.S., of Madrid, illustrated by nine drawings of models, and also a model of a supernumerary incisor carved in ivory, for which latter production Mr. Edwards was especially congratulated on his skilful handiwork. [*See Page* 1119.]

As the paper was one which required some amount of thought, it was considered better to postpone the discussion upon it until the next meeting, by which time the paper would be in the hands of the members; and it was decided to have woodcuts made of seven of the more important illustrations for the better consideration and study of the cases in question.

The President then proposed that Mr. Edwards should be elected as a corresponding member of the Society, and that a vote of thanks should be accorded to him for the labour and trouble he had been to in order to bring the matter under their notice, both of which propositions were carried *nem. con.*; and the Secretary instructed to communicate the same to Mr. Edwards.

CASES OF INTEREST.

Mr. Wilson exhibited models of two cases (both uppers) having relation to Dr. Edwards' paper.

In the first there were, on the right side, a central, a geminated lateral (two laterals), and a canine, all temporary; on the left, a permanent central, with a lateral and a canine, both temporary. The central had succeeded a geminated tooth (central and lateral).

In the second, the second premolar on the left side was represented by a rudimentary tooth whose crown was hemispherical. On the opposite side the temporary tooth was still in place.

Mr. Stirling exhibited the molar of a horse, the roots of which were involved in an odontome of some considerable size.

Mr. Campbell exhibited a first bicuspid with two very divergent roots, in this latter respect more resembling a temporary molar, also some thin tapering rolls of gutta-percha for filling roots, especially useful for the pulp canals of canine teeth; although not new, he wished to draw the attention of the members to some of the advantages to be derived by employing them.

The President announced that the next meeting would be held on Thursday, December 10th, at 7 o'clock, at which it would continue to be held during the current session.

GLASGOW DENTAL STUDENTS' ASSOCIATION.

Special General Meeting, held 30th November, 1885.

O. Fergus, Esq.. L.D.S., D.D.S., in the chair.

The minutes of the previous meeting were read and confirmed. The President then said that Rees Price, Esq., had promised some time ago to show the models in connection with Dr. Coffin's system, and that he was here this evening to fulfil his promise.

Mr. Price then stated that he was sorry that, owing to a previous engagement, he had been unable to show the models on the Association's regular meeting night. Mr. Price then explained the uses of the piano-wire system. Considerable discussion took place. Mr. Price was asked by the President to convey the thanks of all present to Dr. Coffin for so kindly allowing his models to be exhibited. A hearty vote of thanks was then awarded Mr. Price for his kindness. Mr. John Beggs, junr., presented the Association with the model of a mouth with supernumerary teeth. The meeting was then closed.

GLASGOW DENTAL STUDENTS' ASSOCIATION.

A grand inaugural dinner, in connection with the above association, was held on Friday, the 11th December.

J. R. Brownlie, Esq., Hon. President, occupied the chair, and Dr. Fergus, President, acted as Croupier. A most enjoyable evening was spent. For the instrumental part of the proceedings, Messrs. Price, A. P. Sinclair, and J. Sinclair are to be complimented.

The toast of the "Dental Profession" was proposed by Dr. Meighan, and replied to by Mr. John Melville, L.D.S.

The "Glasgow Dental Students' Association" was given by Mr. Rees Price, L.D.S., who, in the course of his remarks, advised all graduates in dentistry to join the British Dental Association. This toast was responded to by Dr. Fergus.

The toast of "Kindred Societies" was given by Mr. John A. Biggs, and replied to by Dr. Cormack, President of the Edinburgh Dental Students' Association. "Success to the Dental Hospital" was proposed by Mr. W. H. Woodburn, and replied to by Mr. Alexander, C.A., Secretary to the Dental Hospital.

Mr. W. D. Woodburn, in an eloquent speech which brimmed with poetry, gave "The Ladies," and was suitably replied to by Mr. D. R. Cameron, L.D.S. The "Strangers" were proposed by Mr. Thomas Wilson, and the "Chairman" was given by Mr. John Biggs, Junr.

A demonstration on Continuous Gum Work was given by J. A. Biggs, Esq., at his own house on Saturday, 12th December. There was a large attendance, and considerable interest was shown. At the close of the meeting a hearty vote of thanks was awarded Mr. Biggs, who suitably replied.

VACANCIES.

VICTORIA DENTAL HOSPITAL OF MANCHESTER.

The Committee have decided to appoint a Dental House Surgeon. Applications are requested to be forwarded to the Secretary.

BIRMINGHAM DENTAL HOSPITAL.

The Committee are open to elect a House Surgeon. Applications on or before the 10th inst., to be forwarded to the Honorary Secretary.

British Journal of Dental Science.

No. 432. LONDON, JAN. 15, 1886. Vol. XXIX.

ON CYSTIC AND ENCYSTED SOLID TUMOURS OF THE JAWS, WITH OBSERVATIONS ON THE STRUCTURE OF THE ENAMEL ORGAN.*

By F. S. Eve, F.R.C.S.
Pathological Curator of the Museum of the Royal College of Surgeons, Assistant-Surgeon to the London Hospital.

Mr. President and Gentlemen,—It was with much pleasure that I acceded to the request of your Secretary that I should read a paper before this Society, knowing that I should have the honour of addressing gentlemen having an intimate knowledge of the subject I have chosen, although regarding it from a somewhat different standpoint to myself. Tumours, particularly cystic tumours, of the jaws have for some time attracted my attention, and they formed the subject of a lecture † which was published in the *British Medical Journal* in January, 1883. It is to some of the views therein brought forward that I desire, in part, to ask your indulgent attention, and I need hardly apologise, seeing the extent of contemporary medical literature, for passing to some extent over old ground, more especially as the conditions of the present meeting enable me to illustrate the subject by microscopic drawings and specimens.

It is my intention neither to speak of the single or simple cysts met with in the jaws—namely, the small inflammatory cysts attached to the roots of teeth, which Magitôt has designated as periosteal cysts,—nor of cysts directly connected with more or less perfectly developed tooth-follicles, which are included under the general names of dentigerous or follicular cysts. But, in the first place, I shall enter into the consideration of certain points in the pathology of the multilocular cystic epithelial tumour (formerly known as multilocular cystic disease, cystic or adeno-sarcoma) that appear to me to have a more immediate bearing on your speciality; it will, however, be necessary to prelude my observations by a brief description of the clinical character of these tumours.

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* A paper read before the Odontological Society of Great Britain.

† An Erasmus Wilson lecture delivered at the Royal College of Surgeons, 1882.

This disease occurs at all periods of life from infancy to old age, but is commonest in early adult or middle age; of twenty-six cases which I collected, twenty persons had reached the age of twenty years when they came under observation. It more commonly affects the lower than the upper jaw, and the molar region, as in the odontomata, is usually, but not exclusively, involved. Its onset is insidious and its progress slow, extending in some cases over a period of twenty years. The patient notices a swelling near the alveolus of a carious or inflamed tooth, or a blow has been received on the part, but in many cases no such exciting cause has existed. The swelling gradually increases, and the teeth overlying it become loosened and may fall out. Not infrequently a glairy fluid is discharged from a vacant alveolus, of which the orifice may become ulcerated.

In the lower jaw the morbid growth invades the cancellous tissue and expands the compact walls of the bone, chiefly the outer, giving rise to a prominence, which is at first rounded, but later, from the formation of numerous cysts, assumes a largely nodulated form. As its growth progresses the osseous walls become thinned, and in some parts yield to pressure with parchment-like crackle, while in others they become absorbed and fluctuation may be obtained. In the upper jaw the growth projects into and distends the antrum, with at first little expansion of the outer surface; and the cyst formation is usually less marked.

A section of a typical specimen of the disease in the lower jaw displays an agglomeration of cysts, of sizes extending to an inch or more in diameter, and divided by thin septa of fibrous or, in some instances, of osseous tissue.

Most of the cysts are filled with a thick glutinous fluid, and the larger often with a brown serous fluid. The advancing or young portions of the tumour consist of a reddish-brown friable substance, not unlike, and which doubtless has often been mistaken for, a myeloid sarcoma. In some tumours the cysts are uniformly of small size.

I have shown that in minute structure these tumoure are composed of branching and anastomosing rods or columns of epithelium, portions of which are cut off and form alveoli. The original germinal epithelium is modified in various degrees in different tumours, and in different parts of the same. The outer layer of cells, forming the columns and alveoli, become elongated or columnar; the central cells undergo colloid degeneration, and give rise more or less perfectly to the appearance of a reticulum of stellate cells, thus reproducing the structure of the rudimentary enamel organ.

The scanty stroma is composed of fibrous tissues, but when abundant consists of embryonic tissue in various stages of development towards the formation of fibrous tissue.

The colloid degeneration of the cells, and the accumulation of fluid in the alveoli, gives rise to the formation of cysts.

It is to the mode of degeneration of these cystic tumours that I wish to call your notice, not only on account of its pathological interest, but chiefly because it appears to me materially to assist us in arriving at a conclusion in regard to a point in the histology of the development of the teeth which is not finally settled, namely, the mode of degeneration and removal of the central cells of the enamel organ.

Before discussing this question, let me in a few words recall to your minds the salient facts of the development of the teeth.

About the seventh week of embryonic life a downward projection or ingrowth of the epithelium lining the dental groove takes place along the whole length of the jaws. At certain points corresponding to the future teeth, papilla-like projections extend downwards from this ingrowth to form the rudimentary enamel organ. Coincident changes take place in the subjacent embryonic tissue resulting in the formation of a mass of gelatinous connective tissue, the tooth papilla, of which the round upper surface projects into and invaginates the rudimentary enamel organ, converting it into the enamel cap. The enamel organ is at first composed of round rudimentary epithelium, lined by a layer of elongated or sub-columnar cells, like to and continuous with those composing the deep layer of the epithelium of the mouth. In the progress of its development, the cells composing the enamel cap are differentiated. The inferior or inner layer—that nearest the tooth papilla—forms very regular columnar cells, from which the enamel is subsequently developed ; the outer layer remains for a time polyhedral ; while the intermediate cells, or those composing the middle layer, undergo a peculiar transformation, resulting in the formation of a tissue composed, apparently, of stellate anastomosing cells, and formerly thought to be mucous connective tissue ; this layer subsequently disappears. Two views may be entertained regarding the manner in which this peculiar change in the middle layer of cells is brought about : the one, which I must own is very generally accepted, and receives the support of the high authority of Dr. Klein,* is that the cells are compressed and flattened by an accumulation of fluid between them, that is, in the intercellular substance ; the other, that the cell substance itself is degenerated, and this view is apparently held by Waldeyer, who says that he is unacquainted with a similar metamorphosis in any part of the body except in the epithelium of the Graafian follicles, "but never occurring [there] in as regular a manner." † He, however, does not enter into an explanation of the nature of the process.

Now I shall endeavour to show that the latter is the correct view, and that the metamorphosis in question is the result of a form of liquefaction or colloid degeneration of the protoplasm. But, before arguing from pathological appearances in order to elucidate histological changes, it is necessary to substantiate more completely the fact that these tumour formations are structurally analagous to the rudimentary enamel organ. The resemblance was not only observed by myself in greater or less perfection in twelve specimens which I examined, but two cases have been also described in Germany by Falkson and Bryck respectively, and these so closely resembled the enamel organ, that from this circumstance mainly, they argued that the growths proceeded from the rudiments of a tooth arrested in its development. Quite recently Bernays, an American surgeon, in describing a similar case, has adopted the same view.

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* Atlas of Histology.

Sticker's "Handbook of Histology," vol. i. p. 280.

It is true that the tumour formations present considerable differences amongst themselves, but the forms are all transitional, and grades from the most elemental to the most distinctly marked type of the rudimentary enamel organ, are even observable in the same tumour.

(*To be continued.*)

A FATAL CASE OF HÆMORRHAGE FOLLOWING TOOTH EXTRACTION.

By Henry Albert, M.R.C.S., L.D.S.,
Dental Surgeon to the West London Hospital.

The following fatal case of hæmorrhage from tooth extraction occurred in St. George's Hospital :—

J. T., æt. 22, was admitted as an in-patient on Oct. 9th, 1885, suffering from chronic synovitis of the right knee, the result of a blow. This progressed very satisfactorily, when he was seized with toothache. On the same day, Dec. 28th, the dental assistant, in the absence of the dental surgeon, removed a carious right lower first molar without difficulty. The hæmorrhage ceased a few minutes after the operation, but shortly after re-appeared so profusely that it was deemed advisable to plug the socket.

Nov. 30th.—There is still much bleeding ; patient pale and anæmic. Cavity plugged with bees-wax.

Dec. 1st. Ordered—

Ext. Ergot. Liq. ... ... ♏xxx
Aquam ... ... ℥j

once, and to be repeated every three hours. Besides this, Oil of Turpentine and Tincture of the Perchloride of Iron were administered, the former being applied locally as well ; but all failed in checking the bleeding.

Dec. 3rd.—Patient weak; Perchloride of Iron, Matico leaves, the actual cautery, and various preparations were all tried, and found ineffectual. There is a good deal of sloughing of the gums. Blood is welling up freely from the socket. Mr. Dent, one of the Surgeons to the Hospital, was sent for. Under ether an attempt to plug the socket with a piece of wood was made, but failed; the anterior wall of the alveolus was then broken away, and solid Perchloride of Iron inserted into the socket, a pledget of lint was placed on this, and a cork in the lint; the jaws were then bandaged together. The hæmorrhage recurred shortly after the operation. Mr. Dent saw the patient in the evening, and the plug was re-applied. At midnight, the house-surgeon removed the cork and applied lint soaked in Oil of Turpentine. Hypodermic injections of Morphia were given at 4.5 and 5.40 p.m.

Dec. 4th.—Early this morning the house-surgeon removed the plug and packed the cavity lightly with cotton wool soaked in Ruspini's Styptic. Patient anæmic and sleepy from opium. Pulse full and regular. There has been but little hæmorrhage since this morning. In the evening the wound began to ooze, and about 10 p.m. the bleeding again became profuse. At 12 p.m. Messrs. Howard, Bennett and Dent met in consultation, and decided upon resorting to further operative measures. Patient placed under the influence of ether. Mr. Dent then made an incision in the middle line of the lower lip and carried it forwards and to the right. The soft parts were then cleared from the bone, and the latter divided by a saw-cut passing through the tooth-cavity; the canal for the inferior dental artery plugged on each side with wool; the divided ends of the bone were not wired. The flap was replaced and secured with hare-lip pins.

Dec. 5th.—About three hours after the operation considerable hæmorrhage took place from the wound. Dressings and hare-lip pins removed, and the wound exposed to the air, and mopped with Ruspini's Styptic. The bleeding gradually ceased, and at 10 a.m. the flaps were brought together with strapping. Patient waxy in appearance, and cold. Pulse 144, soft and easily compressible. Respiration shallow.

Later on the hæmorrhage recurred and patient expired quietly at 8 p.m.

Hæmorrhage is a sequela of extraction which none can absolutely prognosticate. There are, however, certain indications which, though neither definite nor constant, may, when present, put the dentist on the *qui vive*. The appearance of the patient is often very striking, having fair hair, thin, transparent skin, with bright blue veins and pink cheeks. The pulse is full and rapid. Chronic Synovitis is not a very reliable accompaniment of hæmophilia though, as in this case, it is sometimes seen. The predisposition to bleed is often hereditary, usually through the mother: in this instance it came through the father, who (this was only found out shortly before he died, as he positively refused to tell anything of his family history till then) had succumbed to an attack of epistaxis, the patient himself had nearly bled to death on two occasions from epistaxis and a cut finger.

The treatment that arrested the hæmorrhage for the longest time has the local application of Ruspini's Styptic. It stopped the bleeding when everything else had failed in a lad for whom I removed a lower molar root; and who bled, on and off, for eight days and nights afterwards.

I do not know of anything that was omitted in the way of treatment. Styptics too numerous to detail were tried. An attempt to stuff the cavity with Plaster of Paris failed. On one occasion the patient was placed before the open window with his mouth open, hoping the cold air would cause contraction of the capillaries, but with no beneficial result.

Stimulants were administered towards the end. The temperature on Dec. 3rd. was 99° 6 F., whilst shortly before death it registered 102° 6 F., steadily rising in the interval

No post-mortem examination was made.

CASE OF SALIVARY CALCULUS.

By F. Bowreman Jessett, F.R.C.S., Eng.
Surgeon to the Cancer Hospital.

Salivary calculi are of sufficient rarity to justify me in publishing the following case that occurred in my practice lately:—

Kate B., ætat 20, single, servant, of slightly scrofulous diathesis, was sent to me by Mr. Lee, of Boureton-on-the-Water, Gloucestershire, on account of the presence of a salivary calculus which partially blocked up Wharton's duct.

Present state.—A small hard swelling can be easily felt situated beneath the tongue and slightly to the right of the median line. The swelling is about the size of a small nut, elongated, quite moveable, and free from pain. There is no enlargement of the sublingual gland, and the duct is not obstructed sufficiently to prevent the flow of saliva.

The patient first noticed that something was forming about a year previously, and it has gradually increased in size since. It causes her no inconvenience excepting when eating, when occasionally she experiences sharp pains, probably caused by the pressure of some morsel of food. On passing a fine needle into the swelling, the point is felt to grate against a calculus. On October 15, 1885, I made a small opening over the most prominent part of the swelling, and passing a probe behind the calculus, easily removed it. The calculus measures five-eights' of an inch in length and one quarter of an inch across, and resembles very closely in shape a date stone. There is a groove extending along its whole length, along which, undoubtedly, the saliva flowed, thus accounting for the absence of all disturbance in the sublingual gland. Its weight is six grains, and chemical composition, phosphate of lime and soda. The patient returned home the day after the removal of the stone, and has not experienced any discomfort since.

NOTES ABOUT DENTISTRY AT ST. LOUIS, INO., U.S.A.

By John G. Harper, D.D.S.

Perhaps a few lines from here might be of interest to your readers. Dentistry is progressing here, the dental colleges have larger classes than in previous sessions. Many young men, who a few years ago attended one course of lectures and have since been in practice, are now completing their college education. The principal cause of this is the dental laws which many States have adopted. The good work goes on and soon the "dental tramp" will have no place on which to tramp It is reported that two new dental schools are soon to be organised in Chicago. The dentists have been greatly agitated regarding the Section of Oral and Dental Surgery in the Ninth International Medical Congress to be held at Washington, D.C., in 1887.

A conference of dentists to consider the subject was held on the 16th of November in Buffalo, N.Y. The following resolution was unamimously passed :—

"Resolved that we, as members of the dental profession, deem it inexpedient to recommand the organisation of a Section of Dental and Oral Surgery in the International Medical Congress of 1887 under the present circumstances."

You see that the resolution has a "string" to it, and some of the leading members of the profession think that the "string" should be used to withdraw the resolution—indeed, think that such a resolution should not have been passed.*

Bridge work does not meet with the hearty approval of many in the profession, except for replacing a small number of teeth ; but then the work is only in its infancy, consequently must be imperfect. Crown and bridge work must from the very nature of its construction do much to elevate the mechanical education of the present generation of dentists. In order to construct and place in the mouth, a porcelain crown requires a high order of mechanical skill ; this skill acquired will aid very much in producing a better class of artificial dentures, be the base gold, cherplastic, or the vegetable bases.

The question is often asked if gold is being used for plates as much as in former years, of course not going back to the time previous to the introduction of rubber. I should answer by saying that it was used just as much and probably more has been used in the past five years, than in the five years proceeding.

The favourite mode of making full dentures, is to construct a base plate of gold and attach the teeth with rubber or celluloid, such plates being more cleanly than the old style of gold backed teeth. Celluloid has fallen into disgrace on account of its lack of durability. I quote from a report of Dr. E. A. Stebbins, made to the Connecticut Valley Dental Society.

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* A section on Dental and Oral Surgery has been established for our special work, upon the same footing as all the other sections, and under the leadership of gentlemen of eminence in the profession, honoured at home and abroad.

Blanks for a record of artificial dentures were sent out, and one of the questions was: "How many years before a new plate was made?"

Rubber - - -	6 years,	7 months.
Celluloid - - -	4 "	4 "
Gold - - - -	16 "	"

The averages were made from 537 cases.

THE ALVEOLO-DENTAL MEMBRANE: UNITY OR DUALITY—WHICH? *

By L. C. Ingersoll, D.D.S., Keokuk, Iowa.

The tissue named as the subject of this paper commends itself to the thoughtful consideration of the dental profession by higher claims than any other tissue of the formed tooth. There is no health, comfort, usefulness, or safety to the dental organism except this membrane be preserved in health, vigour, and entirety. For the last quarter of a century the attention of the profession has been almost wholly absorbed in the preservation of the enamel and dentine by various methods of filling, and of the pulp by various methods of therapeutical treatment and capping.

Let the entire tooth-crown be wasted by the ravages of decay, and let the pulp die, if but a vigorous root-membrane remains, on the root may be built up a crown the most complete of anything artificially supplied in the human mouth. On the other hand, though the natural crown be perfect, and the pulp still performing its functions, if the alveolo-dental membrane fails the whole structure is gone.

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* Read before the American Dental Association, at Minneapolis, Minn., August 5, 1885, and reported in the *Dental Cosmos.*

Recently more attention has been given to the diseases of this membrane as manifest in alveolar abscess, superficial and deep-seated ulceration, and in *peripyema*, or, as in modern days it has been called, pyorrhœa alveolaris. While close and careful study has been given to and much has been written upon these diseases, the histology of the tissue involved has scarcely been named or thought of.

In looking over the pages of the *Dental Cosmos* for the whole period of its publication, I do not find a single article referring to the peculiar structure of the peridental membrane except one penned by myself, eleven years ago, entitled "A Plea for the Peridental Membrane." It was written with the hope that some one, more competent with the microscope than I, would enter this field of investigation and give to the profession their results. But no one has seemed to take the bait held out, or to have any relish for the digestion of the very limited number of facts now revealed, as a basis for more extended research. The subject is surrounded with difficulties. Authors of dental works have universally ignored it as belonging to the dental tissues. Not one of our standard authors has ever named more than four as constituting the group of the dental tissues—viz., enamel, dentine, cementum, and pulp—three hard and one soft tissue. In studying the anatomy and physiology of these four tissues, years of time have been spent and hundreds of pages have been written. This work has been deemed essential to the right understanding of their diseases. But as no author has ever seen fit to even name the alveolo-dental membrane as belonging to the family of the dental tissues, it has been given but a passing notice, and its diseases have been treated of without special reference to its structure or peculiar relations to the contiguous tissues.

It is not my purpose in this paper to enter into any extended discussion of its peculiar structure, but rather to pick up the fragments of our literature on the subject; then to draw some conclusions as a starting-point for future investigations.

The first question to be decided is, Does it belong to the dental tissues?

To understand its nature and relations, reference must be made to the *dental follicle*, in which all tooth-tissues have their origin and begin to assume their appropriate functions and relations to each other and to surrounding tissues.

Let us call to mind the mucous membrane with its two distinguishing layers, the *epidermis* and the *dermis*, with the membranous line of division between the two known as the *basement membrane.* In the outer layer—the epidermis—the enamel has its origin. In the inner layer—the dermis—the dentine and all the remaining tooth-tissues have their origin.

We are accustomed to divide the fully-formed tooth, for anatomical purposes, into three distinct parts,—the *crown*, exposed to view in the mouth; the *root*, concealed from view by being covered with the gum and the alveolar processes; while that portion covered neither by the enamel nor the alveolar bone, but serving for the attachment of soft tissues to the root, we distinguish as the *neck*, the same corresponding also to the neck of the follicle. It is this *neck*, common both to the follicle and the tooth, to which I wish to call special attention. This will be our starting-point in the investigation as to the proper classification of the tissue lying between the root of the tooth and the alveolar wall.

The early anatomists, regarding the teeth simply as bones, classed the membrane covering the *roots* of the teeth in common with the contiguous bone as belonging to the osseous system; hence they called it the *alveolar periosteum.* Not willing to ignore the teeth entirely as a part of the skeleton, when speaking of the teeth and their surroundings they called the same membrane the *dental* periosteum. In either case the use of the word *periosteum* indicated that they understood that it held its chief relationship to the bone structure, like all periosteal tissue, and they had no distinctions to make between periostea of different bones. If it belongs to the osseous system, it should be born with that system.

If it belongs to the dental structure, it should be born in the dental follicle, and connate with the other dental tissues.

Of the three parts of the tooth named, the crown is the first in the order of development. The next development is the neck, which is now at the base of the dental follicle, where the follicle itself has its vital connection with the sub-dermal tissue, whence it derives its nerve and vascular supplies. This follicular neck, which is the constricted portion of the follicular wall, and marks the base of the dentine germ or papilla, which becomes the pulp of the future tooth, is a point of peculiar interest. Legros and Magitot say—and it was noticed by Robin and Magitot (1861)—that "for a long time before the formation of the first dentine cap there appears between the follicular wall and the organs within it a new tissue, very distinct from the neighbouring parts—in colour, consistence, and in composition. This is the organ upon which will subsequently depend the formation of the cement." In harmony with this account of the origin of the peridental membrane, we find in Tomes's "Dental Anatomy" (page 102) the following: "It should be borne in mind that the tooth-pulp and the tissue which becomes the root-membrane have sprung from the same source." This is all I have been able to find in our dental literature, or elsewhere, concerning the origin of the peridental membrane. As there are no conflicting opinions on the subject, and if the fact stated above shall be demonstrated (as Magitot thinks he shall be able to do), we must for the present take it for granted that it originates in the dental follicle, and has an equal claim with other tissues originating there. No one has any doubt that the pulp is one of the dental tissues, it being the formative organ of the dentine. By parity of reasoning, we should have no doubt of the peridental membrane belonging to the group of the dental tissues, it being the formative organ of the cementum.

We find now at the neck, common both to the follicle and the forming tooth, a cluster of encircling tissues—the follicular wall proceeding upward and covering the crown of the forming tooth, the germinating cells of the root-membrane developing downward with the progress of the developing root, and outside of these a layer of osteoblast cells for the construction of bone to support the growing tooth. In other words, the alveolar walls develop simultaneously with the root of the tooth, though alternating as to the exact periods of time when the increment of lime-salts in each may be observed. Every illustration in our books showing this developmental stage of the tooth-formation shows also the development of the contiguous bone—especially seen in the excellent illustrations furnished by Dr. G. V. Black for Dean's translation of Legros and Magitot's "Dental Follicle."

Just here let it be particularly observed that proceeding out from the base of the dental follicle is a line of cells encircling the neck of the tooth, destined to become the formative organ of the cementum, and immediately contiguous there is another encircling line of cells, originating in the surrounding embryonic bone, and destined to become the formative organ of the alveolar walls and the whole ridge of bone known as the alveolar ridge. For this purpose the osteoblast layer of cells develops downward to form the socket, while the cementoblast is also developing downward to form the cementum ; and these two delelopments are contiguous to each other.

Having thus brought to your notice the different parts of the forming tooth at its neck development, their relations to each other and to contiguous tissue-formations, we are brought to the main question at issue in this discussion, namely, Is the tissue now forming at the neck of the tooth, and destined to occupy the space between the cementum of the root on the one hand and the alveolar wall on the other, *one membrane* ? Is the tissue now known as the dental periosteum, and also as the alveolar periosteum, a single or a double membrane ? Has it unity, or duality, in its structure and relations ?

It has been so generally conceded that the membrane lying between the root of a tooth and its alveolar walls is a single membrane, that the repetition of the statement of its oneness by a succession of authors for the last half century has called forth no dispute. Occasionally a writer has ventured an opinion that it existed as a double membrane; but the opinion expressed has elicited no discussion or systematic investigation. Less has been written concerning the peridential membrane than concerning any other of the dental tissues.

Fifty years ago the dental membrane, as it was called, was said to exist in three parts, or as three distinct membranes—one forming a lining of the pulp-cavity and the root-canal, another covering the root externally, and still a third covering the walls of the alveolus. When the mistake was discovered as to the lining of the pulp-chamber, there being no membrane found there other than the odontoblast layer of pulp-cells, the conclusion was hasty and definite that the portion external to the root lying between the cementum and the parietes of the alveolus was but a single membrane. The early anatomists are wholly silent concerning its structure. Later writers have voiced the general sentiment in few words, that it is a connective-tissue membrane, of fibrous structure, intermingled with cells, the bundles of fibers passing in an oblique direction *entirely across* from the cementum on the one side to the bone on the other, and well supplied with blood-vessels and nerves. The common sentiment on this subject has been given the greatest prominence and boldness of statement by Charles S. Tomes, in his "Dental Anatomy" (page 101). He says: "A mere inspection of the connective-tissue bundles, as seen in a transverse section of a decalcified tooth in its socket, will suffice to demonstrate that there is but a single membrane, and that no such thing as a membrane proper to the root and another proper to the alveolus can be distinguished; and the study of its development alike proves that the soft tissue investing the root and that lining the socket are one and the same thing; that there is but one membrane, namely, the alveolo-dental periosteum." Although Mr. Tomes speaks with the greatest positiveness concerning its oneness and identity of parts, the varying terms by which it has been named show a great indefiniteness in the minds of writers as to its nature and relations; and the fewness of those who have expressed a definite opinion, and the little that has been written upon it, give evidence of the extreme difficulty of making sections which will give satisfactory opportunity for study. Kölliker, in his extensive work of eight hundred pages on "Histology," has thirty-three pages on the human teeth, with only *four lines* of the whole on the structure of the root membrane. When you attempt the study of it by reference to authors, you will find how shy all have been of discussing its origin and relations, though writing extensively concerning its diseases.

Yet, as we shall see, our literature, while teaching the oneness of this membrane, gives us such descriptions of its structure, its origin, and functions as to create in the mind a doubt of its oneness, and some writers venture an opinion favorable to its dual existence. The fact that it has so uniformly been called periosteum naturally leads us to inquire into the structure of periosteum. Kölliker says: "The periosteum is not everywhere constituted alike. Where mucous membrane rests upon bone the periosteum is, in most cases, very intimately united to it, so that the two cannot be separated, but constitute a single membrane, as in the alveolar processes. With respect to the intimate structure of the periosteum, it will be found to present almost universally *two layers*, which, although closely connected, differ more or less distinctly in their structure. The periosteum of the alveolus is very intimately connected with the fangs of the tooth, and has the same structure as any other periosteum." This much, then, Kölliker says—that the alveolar processes at their margins are only covered with the mucous membrane without any underlying gum-tissue, and have a periosteum existing in a single layer; but that the periosteum dipping down from the margin into the alveolus exists in two layers like any other periosteum. We may with propriety ask, Where does it get its other layer? Gray makes the same statement concerning the periosteum in general, that it exists in two layers; then quotes approvingly the language of Kölliker concerning the structure of these two layers. So far as I can learn, anatomists agree as to the structure of periosteum in general, that it exists in two distinct layers. If, therefore, the alveolo-dental membrane is a true periosteum, as all the earlier writers regarded it, we shall expect to find it existing in two layers. While analogy leads us to expect it, demonstration proves it. When a tooth is extracted from its socket the root is found covered with a membrane of soft tissue ; and when the alveolus is examined the walls are also found to be covered with a membrane, which not only proves the duality of the root membrane, but that one may, by violence, be separated from the other. This can most distinctly be observed by the unaided eye in cases of chronic inflammation of this membrane.

The fact that after the extraction of a tooth a membrane is left lining the alveolar walls is plainly evident from the additional fact that a case of necrosis arising from simple extraction without fracture of the bone is never known ; whereas, if the periosteal covering of the bone was removed with the tooth, cases of necrosis and exfoliation of the socket would be common and almost inevitable.

If, now, the root membrane exists in two distinct layers or parts, have the two parts the same origin ? Kolliker says that the periosteum covering the alveolar processes has but a single layer,—that this is exceptional with regard to periosteum. It is favourable, however, to the idea of a double membrane between the root and the alveolar walls. For it is almost uniformly stated by writers that the lining of the socket of the tooth is but a continuation of the membrane covering the alveolar processes externally, and that the shell of bone forming the socket does not differ from the corticular portion of bone forming the processes. This being the case, the origin of the alveolar lining must be referred to the osseous system, and its function is to form the bony walls of the alveolus. On the other hand, Legros and Magitot speak of the origin of *another* membrane at the base of the dental follicle, between the follicular wall and the organs within it, and very distinct from the neighbouring parts, which becomes the formative organ of the cementum. Will any one pretend that the authors intended to include the organ that forms the alveolar walls ; that the membranous organ born within the dental follicle, and by its origin declaring itself to belong to the family of the dental tissues, becomes the organ that forms the alveolar processes, which belong distinctively to the osseous system? Is it not much more rational to suppose that the bony socket is built up by a periosteum of its own, like the other compact corticular bone of the alveolar processes?

We now find two membranes arising from opposite directions, yet lying in immediate contact with each other, which become intimately united. This intimate union of the two does not, however, constitute them one membrane in any such sense that they lose their duality. For the *more* intimate union of the membrane with the cementum does not constitute these two tissues one; nor does the like intimate union of the periosteal membrane with the bone constitute both one. They are still distinct and separable.

Having found two membranes or layers, of different origin, yet performing a similar work, in harmony with each other, let us next inquire as to the structure of these two layers. Kolliker's statement is that the dental periosteum does not differ from periosteum generally, and for this reason he writes but four lines concerning it; considering that he has sufficiently treated of its structure in connection with the osseous system. Of the periosteum he says: "The outer layer is composed chiefly of connective-tissue, with occasional fat cells, and is the principal seat of the true periosteal vessels and nerves; whilst in the inner layer elastic fibers, commonly of the finer sort, constitute continuous and often very thick networks." Tomes, in writing of the alveolo-dental membrane (page 101), says: "At that part which is nearest to the bone the fibres are grouped together in conspicuous bundles; on its inner aspect, where it becomes continuous with the cementum, it consists of a fine network of interlacing bands, many of which lose themselves in the surface of the cementum." Again, he says: "Although there is a marked difference in histological character between the extreme parts of the membrane" (i.e., between the part next to the bone and the part next to the cementum), "yet the markedly fibrous elements of the outer blend and pass insensibly into the fine network of the inner part, and there is no break of continuity whatever." The chief difference, therefore, between Kolliker's description of the periosteum and Charles S. Tomes's description of the root membrane is, that what the former calls "layers" the latter calls "parts." Wedl says but little concerning its structure, but intimates that he considers it a continuation of the periosteum of the alveolar processes. He says: "The root membrane is a delicate connective-tissue membrane, containing an abundance of vessels and nerves; it is intimately connected with the submucous layer of the gums and with the periosteum of the alveolar processes, and covers the root of the corresponding tooth." He then quotes Magitot, in the following words, "The root membranes consists of two portions: an inner, which does not admit of being teased into fibrils; and an outer, which has the appearance of a fibrous structure." Spence Bate, a distinguished physiologist of England, says that "two distinct structures may be traced in the tissue which connects the root of a tooth with the walls of the socket, viz., the peridentium of the tooth and the periosteum of the bone." The former he regards as a dermal tissue; the latter as belonging to the internal or osseous system. He then says further: "However closely in juxtaposition the two may approximate, they still hold their relative connections widely apart. The cementum is the production of the inner surface of the peridentium, and is no way connected with or dependent upon the periosteum of the socket." Concerning this view of Spence Bate, John Tomes, in his "Dental Surgery" (page 505), remarks: "Although the presence of the two membranes may be assumed to exist, it would, I think, be extremely difficult to demonstrate them individually."

A HOT AIR SYRINGE, SIMPLE AND EFFECTIVE. HOW TO MAKE AND USE.

By George Pedley.

Turn up a brass ball about the size of a Solanum berry; drill a hole through the centre; and hard solder about half an inch from the nozzle end of an ordinary chip syringe (or, preferably, make one with a larger bore.)

A suitable temperature of blast is obtained by placing the ball in the flame of a spirit lamp, till it sizzles when wet. Plunge it into water and instantly withdraw. Blow out the steam (which is drawn into the india-rubber ball by the partial vacuum created) and sufficient heat will be left to desiccate the surface of dentine, in any cavity previously dried with amadon or cotton wool. This will be evident by the whiteness and opacity it assumes.

Wipe the cavity out with amadon or cotton, moistened with Fletcher's copal and ether varnish, and again apply the hot air. This leaves the cavity in good condition for all fillings especially cohesive gold, as it prevents the first portions from rolling under the plugger. It is important that the varnish should be kept thin with chloroform or ether. The desirability of dry cavities is evident: but the value of a hot air syringe is quite as great in allaying the sensitiveness of dentine and obvious on a re-application of hot air after using the copal varnish.

It is desirable that others of the numerous readers of the *British Journal of Dental Science* will communicate their experience upon this contrivance, and so add to the interest and usefulness of the *Journal*.

Cocaine in the Ear for Neuralgia.—Notwithstanding the various antineuralgic remedies—to say nothing of "nervines" and "pain-killers"—a successful method of relieving the pain of obstinate facial neuralgia has long been a great desideratum. Dr. de Coninck, of Ledeberg-lez-Gand, writes to *The Scalpel* that an application of a 1 per cent. solution of hydrochlorate of cocaine by a camel's hair brush or a dropper to the bottom of the external auditory canal arrests the pain of neuralgia of the facial nerve, and, indeed, any pain in the temporal region, instantaneously. He has not found this treatment of the same value in neuralgia of the fifth nerve, but suggests that perhaps some other point of application may exist for this nerve. Dr. de Coninck has employed this method of treatment for a month—he does not say on how many cases—and has "never failed to obtain the most marvellous success." If the neuralgia returns, application can be repeated.

British Journal of Dental Science.

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THE TEETH OF A NATION.

It is really not so far fetched a notion, that the national traits of a people may in a measure be determined by the teeth of those units which constitute its members. We can certainly ascertain much about an individual by overhauling his denture ; we recognise his sins and even go a step further and discover there have been sins of his ancestors. Sins alike of commission and of omission. But, perhaps, class habits, class follies, and ignorances are more completely portrayed, than are even those of the individual, and it is easily to be understood why this should be so, for in the former case we have a wide field of comparison, which fills in the picture, and explains principles, while in the individual we see only exceptions which may be unique or examples of a widely extending law. The subject of the ethnological side of dentistry is one of not only primary interest, but of vast practical importance. The maintenance of the health of the teeth in the individual means alike sanity of mind and body, freedom from what the old-world physicians called "ill humours." The expression is a pregnant one. All vital functions were in the old days held to be due to "humours" or currents of imponderable material which pervaded the body. Thus there was a nervous humour to explain nervous action, and so on. When anything went amiss with a man, in short, when he was ill, his body was held to be invaded by evil humours, and every one will confess that there is no more fertile source of ill humours in all senses of the phrase, than maladies of the teeth, the happiness of the home, health, the success of a man's city career certainly depend upon whether or no his teeth are in reasonably sound working order. Again, the effect of bad teeth in one generation reveals itself in extra bad teeth in the succeeding one, and so on, until a period is reached when we find families possessed of such hopelessly ill-formed, ill-preserved and ill-conditioned teeth, that they are past preservation even by the most careful conservative treatment. We will assert then that the perverse conduct of one generation in neglecting its teeth carries with it, as a necessary rider, the depreciation and deterioration of the succeeding generation. Then it is not far to seek that what applies to the individual, applies to the whole mass of persons forming a class in society. As in the one case the family stock becomes so injured, that its members look upon their bad teeth as hereditary evils, so in the other it is observed that the diseased conditions of the masticatory organs are handed down from the careless or ignorant people of one generation to their children, so that a section of society, generation by generation, presents to view a progressive deterioration in their denture. As, moreover, we are familiar with a host of digestive troubles, frequently called gouty, but which are usually the result of food bolted instead of masticated, the teeth being too brittle or painful to allow of chewing, so in the wider aspect of the matter, we find a generation weakened, ill-nourished, neuralgic, from the soles of their feet to the scalp of their head, giving birth to a progency still more infirm than themselves. Can a man with toothache legislate the foreign policy of a nation ? It seems to us he will do so about as well as would an army and navy of men carry out his policy, were they the offspring of the crippled creatures, whose condition we have described above. Now this is far from being a strained view of the matter, it is what every dentist will recognise as being a common-sense statement of what must and will happen, if the teeth of a nation be allowed to take care of themselves.

So rife is ignorance concerning all dental matters among the public, and even among medical men who should know better, that we deem it our duty to urge the most serious attention to what we propose to bring forward in this, and succeeding articles. There is little doubt that, with perhaps exception of the most wealthy classes, and those who are brought in contact with them, and so ape their manners, that the teeth are practically entirely neglected, and tended by the individual in the most perfunctory and slovenly fashion, or are brushed to bits with adamantive tooth brushes, rasped wrongly across the teeth, and are never brought to the dentist until they have become hopelessly burrowed and tunnelled through with pus or badly abscessed. Under such circumstances what can be done? If the patient has wisely gone to a good dentist, the shell comes out; it may be piecemeal, but it does come out, and the patient goes away relieved, and only returns when some more of his grinders have followed down the same road to ruin. If, on the other hand, gulled by posters and newspaper puffs, he has gone to one of those many advertising dentists, who bring discredit upon the calling they profess, his case will be otherwise; but we will draw a curtain over the harrowing picture.

Journal of the British Dental Association.—We understand that considerable changes are contemplated in our contemporary. Mr. Underwood, who assumes the editorial reins, brings with him special facilities for the task he undertakes, as he is not only a dentist writing to dentists but is known in connection with research work of a scientific nature. There is so much need for really good literary work and journalism among the dentists of England that we shall welcome every prospect that presents of *bona fide* good work. We have always recognised the intrinsic value of the Association, and even though we have found ourselves unable at all times to endorse its policy yet we trust that as its effects have heretofore been so excellent, that the changes contemplated will render the mouth-piece of the Association even more generally useful than heretofore.

THE NATIONAL DENTAL HOSPITAL DANCES. — Our readers will not forget the second series of these dances are now inaugurated. The support these festivities call for is of a two fold nature: you can help forward an excellent institution by buying tickets, and you can help yourself as well as what Mr. Oldbuck in Scott's "Antiquary" called his "womankind" to an evening of much enjoyment. Who is proof against doing a good action, when the performance brings with it a very substantial reward?

THE DENTAL HOSPITAL OF LONDON.—The increasing strain imposed upon the anæsthetic staff of this hospital, owing to the large number of patients who daily present themselves for relief, has induced the committee of management to appoint an anæthetist for each day in the week, so Messrs. Braine, Bailey, Milles, and Bird have each taken one day in the week while the remaining two days are left for the new comers. The assistant anæsthetists appointed are Dr. Dudley Buxton, the Anæsthetist to University College Hospital and others institutions, and Dr. Hewitt, who was, we believe, attached to the recently elected anæsthetic staff of the National Dental Hospital.

THE AMERICAN DENTISTS AND THE INTERNATIONAL MEDICAL CONGRESS.—The consulting dentists in Buffalo have, says a transaltantic contemporary, decided to hold aloof from the Oral section of the Congress. Their policy is inexplicable to us, unless they consider themselves as in any way representative of the profession. Mere personal disageements do not certainly form a fitting excuse for even the most intelligent minority publicly withholding its support from a national undertaking. In England we are ready and willing to recognise the value of American dentistry, to hold out the hand of good fellowship to our transpontine brethren, but splits in their ranks must suggest something wrong somewhere, and we are particularly anxious to learn where.

The Southern Dental Journal devotes much attention to the subject, and while we go wholly with our contemporary, we wish we could find some authoritative statements about the Oral and Dental sections. Dr. Taft would do the section and dentists in general a right good turn if he would sketch out some sort of a programme and keep us *en rapport* with the feeling of the leaders on the other side.

THE DEATH OF DR. RIGGS.—Dr. Riggs, whose name is so familiar to us in connection with pyorrhœa alveolaris, has passed away. At the ripe age of seventy-five Dr. Riggs died of acute bronchitis, in harness up to the last. It was Dr. Riggs who extracted the tooth from the head of Horace Wells, while the latter was rendered anæsthetic by nitrous oxide, on Dec. 11th, 1844, initiating, by his success, a new era, viz. : the introduction of anæsthesia into dental and surgical practice. The body of Dr.Riggs was cremated.

SIC TRANSIT *et cet.*—We regret to see the discontinuation of a medical contemporary—*The Medical Times and Gazette.* In a modest and unassuming manner this paper has for years striven to keep up some of the best traditions of English journalism, it has proposed to itself to present to its readers the scientific side of the profession, and to maintain an impartial unbiassed judgment in professional politics. Servility and homage to the powers that be, seem to be the great passports to success in British journalism. " Catchpenny " is a wonderful *cultus.*

SAVING TEETH.—We don't believe in advertising, or we should suggest all dentists might with advantage have the appended paragraph from *Health and Home* neatly printed and sent to their acquaintances, both great and small :—" It is, and should be the aim of dentistry to preserve the natural teeth. But the popular idea of the business of a dentist is that he was created for the special purpose of extracting teeth and hurting people ; and, unfortunately, this idea is the result of the practice of the average dentist in the past, and many below the average in the present, who would no more think it possible to save an aching tooth than to raise a man from the dead. " Pull 'er out," is the too general advice, and too frequently a dozen others go with it to be replaced by a set of artificial teeth the rest of the natural life."

A Dental Alphabet.—Or we would venture something of this sort. Reasons why I go early to my dentist:—

Avoid loss of teeth.
Banish pain.
Calm irritability.
Drown neuralgia, and so on.

Re-plantation of Teeth.—*The Dental Cosmos* gives the following cases:—In case I. it was necessary to extract a lower (2nd) left bicuspid for a gentleman who was anxious to have the tooth saved, but who lived so far distant that it was impossible to have it treated. Re-plantation was suggested. He finally consented, and the tooth was filled and replaced after syringing the socket with tepid water and holding the tooth for a few moments in warm water and glycerin. Then, giving him a few capsicum plasters, and instructing him to use them in case of inflammation, he was asked to report in a few weeks. After four weeks the tooth was firmly fixed.

Another case of Re-plantation—a young man, Mr. B., of robust constituion presented himself at six o'clock in the evening, accompanied by his mother, who reported that two hours previously her son had had the two upper central incisors knocked out by a fall from his horse. The horse had fallen first, and the rider struck the knee of the horse in such a manner as to knock out the two teeth, which were found on the ground a half hour later. In examining his mouth the alveolus was found fractured externally, the blow having been from within outwards. The maxillary was split between the right cuspid and the right lateral incisor. Since the accident he had continuous but slight pain, increasing much when we sought to separate the lateral incisor from the cuspid. It was decided to try re-plantation of the tooth. Success appeared very doubtful, as the teeth were dry, having been picked from the sand and afterwards carried in the vest pocket. The extremities of the roots were sawn off for a length of two millimeters, and placed in lukewarm water for a quarter of an hour. An impression of the mouth was then taken, and in half an hour an apparatus of gutta-percha strengthened by platinum wire was fashioned, leaving the necessary space for the two incisors; the teeth meanwhile were replaced in the mouth, and held there with the fingers. After placing the apparatus in position, the patient was dismissed, being recommended to diet for two or three days on soups and milk. Repeated applications of an aqueous solution of chlorate of potassa was the only other recommendation made to him.

A third case of Re-plantation—Annie R., twelve years of age, was brought by her mother, with the left superior lateral incisor broken off; the root hopelessly decayed, badly ulcerated, and fistulous; altogether beyond the possibility of being put in a condition to support a grafted crown of any description. As the dentist considered her too young to wear a plate, he determined on transplantation, if a tooth could be found that would at all suit the case. A tooth was found which had been extracted six month before. The diseased root was extracted, and an appointment made for the patient the following day. The root of the selected tooth was then shortened and rounded off with a file; the nerve canal opened from the apex, cleansed, and filled with oxychloride of zinc, and completed at the apex with cohesive gold. A strip of platinum plate was then bent over the cutting-edge of the tooth, and burnished to fit the labial and lingual surfaces, terminating at both ends in sharp points at the original line of the gum. A bit of silver wire was provided and laid aside with this platinum stirrup, and the tooth placed in a vessel of glycerin to await the patient. But an almost incessant November rain kept her away until the twelfth day after the root had been extracted. The socket was found to be rapidly filling with healthy granulations, which were removed with one dextrous sweep of the lancet, and mopped out with a mixture of carbolic acid and turpentine. The tooth, which had been allowed to stand ten or fifteen minutes in warm water, was now placed in position and pressed up firmly into the socket. The silver wire was passed round this and the two abjacent teeth near the gum, and the ends twisted together with pliers until tight. The platinum stirrup was placed over the crown and the pointed ends bent outwards over the wire which held the tooth perfectly firm. An aperient was directed for three succeeding mornings, and aconite and iodine to be painted on the gums in case of inflammation. There was no inflammation, and the patient did not complain of any pain. To make assurance doubly sure, the stirrup bandage was not removed for three months, when the tooth was found to be perfectly firm and solid, the gum pink and healthy, and it has remained so to this day. It was five years ago the third of November, 1885.

DEATH UNDER CHLOROFORM.—The death of a patient, when under the influence of chloroform, has occurred this week at Turnstall. The facts, as given by Mr. Spanton, at Hanley, at the inquest held on the body, were as follows:—That he had attended the deceased, who was suffering from abscess of the bladder. On two occasions he had administered anæsthetics to the deceased, the first for the purpose of examination, and the second with a view to an operation. The deceased came out of these applications sucffiiently well to justify a third application for an examination and operation. On Sunday, the chloroform was applied in the usual way for the third time by another surgeon, who assisted witness, and in about three minutes the subject became pale, and it was found that the heart had ceased to beat. Every possible effort was made to resuscitate him, but without avail. A verdict was given according with the evidence. The foregoing is reported from *The Journal of the British Medical Association.*—We have but two comments,—first, to ask what is the usual way of giving chloroform, our experience goes to show their are many ways, and, secondly; we deplore such meagreness of detail. Every case should be given in detail.

THE DANGERS OF COCAINE. — Attention is being drawn in New York to the danger alledged to exist of provoking a "cocaine habit" by repeatedly using cocaine, or worse, leaving the administration in the hands of the patient himself. It seems an intractable mania for cocaine is soon called into existence which it is indeed hard to combat. Since cocaine has been largely advocated in the treatment of the morphine habit, it would seem likely that the unwary practitioner may escape out of Charybdis only to fall a victim to Scylla. Speaking of cocaine, we may put our readers upon their guard. It has recently been shown that this valuable anæsthetic is frequently largely adulterated, boric acid being employed for that purpose.

SOFT RUBBER PULLEYS FOR THE DENTAL ENGINE.—Mr. William Herbert Rollins, of Boston, writing in *The Archives of Dentistry* says:—"Driving a dental engine by foot power is tiresome unless the dentist is strong. This is particularly true of the Bonwill engine on account of the number of pulleys and the fact that the belt must be quite tight to prevent slipping. On this account I have three times gone back to the White or Johnstone Engine. I find, however, that a soft rubber band or surface on the driving wheel and a solid grooved disk of soft rubber, screwed tight between two metal disks on the hand-piece will diminish the amount of power required about one half, because the belt can be run loose without slipping. I wrote to Dr. Bonwill about a year ago, but as he did not answer my note and has not put the improvement on his engines, I think it worth while to call attention to the matter."

COUNTERSUNK TOOTH-CROWNS.—"Permit me," says a correspondent of *The Cosmos*, "to make a suggestion concerning the excellent new style countersunk tooth-crown. Practically, the only thing to guard against is a failure to make the base-plate fill the countersinks. Care should be taken to pack small pieces of rubber in each countersink until filled, to prevent the flat sheet from so covering the countersinks as to make them valve-tight, and shut in air; thus preventing the rubber from entirely filling the cavities around the pins. The same result will follow pouring melted base metal into the flask, unless the hot flask is *lightly struck, or jolted*, to expel the air shut up in the countersinks. Using such care, the metal or vulcanite will hold these new teeth with a firmer grip than any of the old styles. The teeth themselves are stronger than any others, because the necks are wider from front to back."

Abstracts of British & Foreign Journals.

THE ARCHIVES OF DENTISTRY.

HOMEOPATHIC THERAPEUTICS IN DENTISTRY.

By J. Morgan Howe, M.D.

The writer thinks that the time is auspicious for a consideration of the desirability of using homeopathic remedies in dentistry.

There has been as yet very little application of the homeopathic system to dental disease, by dentists. Much emphasis has well been laid of late upon the fact that teeth are tissues of the body, and although this truth is quite generally recognized, there has been but little practical application of this knowledge by dentists in the treatment of disease in the maxillary, gingival of dental tissues, by seeking to produce such special effects upon the system as would favour return to normal conditions.

A tooth with a devitalized pulp frequently remains undisturbed for years without giving its owner the least warning symptom, until suddenly, and without local violence, it becomes the seat of an acute pericementitis. That the cause of the painful disturbance, from which the sufferer seeks relief, is the presence of the dead pulp, the fact is lost sight of that the condition has long existed without causing any apparent disturbance, until some change has occurred in the condition of the system ; the toothache of pregnancy is often excited by a dental lesion which would be qute inadequate to permit painful irritation during other conditions of the system ; the advent of pyorrhea alveolaris, and of chemical erosion or abrasion, are not concomitant with any constant local condition, or habit of hygiene, or of food ; caries has its periods of rapid advance and of comparative arrest ; teeth apparently well organized become subject to persistently recurring decay, and teeth that we call poor in structure become perceptibly improved in ability to maintain their integrity without recognized local causes. Noticeable changes in the colour of the teeth occur within so short a time as a week ; and enamel sometimes becomes so brittle that pieces are broken out with ordinary use. These facts direct attention to the necessity for general treatment of some kind. Important as a correct diagnosis is, the question of means to cure is equally so, and should be pursued with equal interest.

The dominant school of medicine, the writer affirms, pursues therapeutics on a basis of some etiological theory of disease, or on a diagnosis of pathological conditions, while homecpathy not only avails itself of all that may be known of etiology and pathology, but proceeds to treat and cure disease as revealed by symptoms, even when the causes and pathological conditions may be obscure or unknown. Thus, without any more accurate knowledge of teeth or their diseases perhaps than other physicians, homeopaths everywhere treat odontalgia by the internal administration of drugs with such success, that with some it is quite an appreciable item in their practice.

The homeopathic materia medica contains an immense number of symptoms of drug action referring to dental and contiguous tissues, many of them useful and reliable, but many also which would perhaps be useless as a basis for prescriptions ; one reason for this may perhaps be that the compilation of these symptoms has been made by those who for the most part have known but little about teeth, and have not carefully observed the condition of teeth and gums so as to be able to discriminate accurately between diseased conditions previously exisiting, and those produced or aggravated by drug action ; but enough is positively known of the effects of many drugs to enable dentists who are desirous of availing themselves of the benefit to be obtained, to begin the study and also the treatment of some diseased conditions by their use. To avoid erroneous conclusions and make as much progress as may be in forming correct judgments, it would seem desirable that local medication should be reduced to a minimum, in order that there may be little cause for doubt as to which of the means employed should be credited with any favourable result.

OHIO STATE JOURNAL OF DENTAL SCIENCE.

DENTAL IRREGULARITIES—THE WIRE SPRING PRINCIPLE.

By Garrett Newkirk, M.D., Chicago.

There are a number of important questions requiring answer, one is that of the causes most commonly operative and another in close connection therewith relates to the anticipation and prevention of irregularities. No positive opinions as to what ought to be done or what results should follow can be given without due consideration of the case, not only as it presents in the mouth but as illustrated by good articulating models. Very careful study of the models should be made. Ofttimes when a person thinks he has well nigh determined the proper course of action to take in a given case, a new inspection of the models or the mouth will reveal some important fact previously overlooked.

The first thing when operative procedure is contemplated is to take impressions of the upper and lower teeth and make articulating models. Then with a smooth pen write name, or initials, and the date on the upper cast, and corresponding initial on the lower. Then give the whole a good coat of shellac varnish inside and out. These models are for study. It is well to take a third impression. These models remain to represent the mouth in the original condition of the case. They show what has or has not been done, they also give the patient an intelligent idea of the condition of affairs in his mouth.

Regulations should be accomplished slowly. As a rule it is not safe to move teeth rapidly, and it is far more painful. A recent example of the folly of hurry is cited where the pulp of a tooth had been destroyed by too great haste. Do not attempt too many things at once. A thorough study of any complicated case will gradually unfold a plan : and in that plan the first step will prepare the way for the second, the second for a third, and so on.

Every case treated involves a partnership. The dentist and his patient must be in full agreement, and have a complete understanding. If the patient be possessed of fair intelligence, he or she can be made to understand something of what is and what is to be done by explanations of the models. If you are going into partnership you want a partner of intelligence and one who will take an interest in the business. It pays to take time and great pains to make him understand what is being done. Most patients will be quite satisfied to endure, if they can only see progress. The general health must be attended to. As the process of moving teeth must be more or less one of disturbance, therefore irritating, hence so far exhaustive or nervous force, usual economy of nervous force is indicated. Late hours must be avoided, and for the time at least the patient must be regular in exercise, rest and diet.

Having prepared models to retain for study and future reference—then another for the first steps in the case, there comes next the question of ways and means. In considering this, very many things have to be taken into account. First, the age of the patient, heredity, the type of face, what conditions are natural and what accidental; also character of teeth and ease or difficulty with which they may be moved. Teeth with short crowns have longer roots, are moved more slowly and with greater difficulty, than those that stand well out. The resistance is greater, the leverage less in relation to the applied force.

Among regulative means there is nothing more effective for good, than extraction in the proper place and time. On the other hand there is nothing worse if carelessly done. Mistakes, if committed about the question of extraction, may be for life. Sometimes, by simply extracting one or two teeth, the natural forces unaided, will produce a beautiful result. By the same process, however, a deformity may be greatly aggravated.

We must never lose sight of the fact that our regulating apparatus and the retaining plate cannot be for always. To make our work permanent, the articulation must be such as to hold the teeth where we leave them. Otherwise, the tendency will be to reproduce the deformity.

As a general rule, the six front teeth should not be extracted to obtain room in a crowded arch. Nearly always a bicuspid, occasionally the first molar should be the victim.

"Regulation of teeth made easy" does not exist. Those delicate bits of machinery you see advertised are valuable for hints, and as indicating what we may do for ourselves. Every good surgeon will be able to make his own splints for fractured limbs. No dentist will succeed in regulating teeth who cannot make and apply whatever is adapted in each case. Simplicity in apparatus is most to be desired.

When a choice of methods exists, and it usually does, the one involving the least discomfort to the patient should be chosen.

Speaking of Coffin's plate, he says that in the hands of practical men, this wire is doing a most excellent work. The principle of its application is very simple, and its capabilities varied. The screw, the wedge, the inclined plane, the elastic band and ligature, all have qualities indispensable in special cases. But the wire spring possesses a greater number of advantages applicable to a greater number of cases than any one if not all the others.

1st. It is simple. The wire can be bent to any curve or angle, and the force modified at will. It may be used alone, but it is nearly always employed in connection with vulcanized rubber.

2nd. Its use is not expensive.

3rd. It is cleanly. The patient can remove and brush his plate often enough to keep it in a decent condition. This he cannot do with a jackscrew plate, or any of those appliances fastened to the teeth by ligatures or cements. Unless a plate may be removed two or three times a day and cleaned, it inevitably becomes offensive, vitiates the secretions of the mouth, and is more or less injurious. In cases where something must be worn for weeks this is of importance.

4th. The wire spring plate is generally the most satisfactory of any to the patient. The wire spring force, properly adjusted, is more gentle and more easily borne than any other. It is mild, but constant and positive; not sudden—all at once—

like the screw and wedge force; not intermittent and incalculable, like that of the inclined plane; not teasing and tormenting, like that of the rubber.

From the moment the spring is applied the power is exerted steadily, persistently; but, as the tooth moves, in a constantly diminishing ratio, so there is a measure of rest, till the wire is bent again. With all satisfactory appliances the patient is powerless to give himself a rest. To this we may find an exception where the patient is permitted to turn the screw and can be trusted so to do. But this exception applies only to the degree of force. As a rule he cannot remove the plates. Of course, there are times when, and patients for whom, it is necessary to use the unremovable apparatus. This is usually in cases where the work may be done in a very few days. Ordinarily the wire spring plate may be worn while the patient is asleep, with but little if any interference with usual rest.

DENTAL READING.

By Dr. S. W. Lakin, Eureka.

The writer insists upon the great importance to the dentist of extending his reading to collateral branches of medicine and surgery. He points out that dentistry is so very intimately connected with medicine and surgery that unless a dentist has acquired at least a competent knowledge of these subjects he cannot be held to know dentistry itself. And again just as such matters as dental pathology treatment and diagnosis crop up so do medicine and surgery advance, so it is incumbent upon dentists to keep themselves in touch with the times relative to these sciences.

AMALGAM—ITS USE.

By Dr. S. F. Duncan, Willmington, Ill.

The writer points out that among the poorer sections o society gold work cannot be done; in such cases he advocates amalgam.

We have no other cheap material that will answer the purpose in a large majority of cases; and by careful preparation of the cavity and material, and its proper manipulation, we can make a reasonably good filling.

How shall this be accomplished?

Firstly, the cavity should be as thoroughly prepared as possible; if a deep one, it must be lined with the oxyphosphate, and especially should this be done if we leave any portion of partially decomposed dentine in the cavity for the purpose of pulp protection or other reasons. All frail walls and overhanging edges should be cut away. He does not recommend to bevel the margins of the cavity as much as for a gold filling, as amalgam has not so much edge strength; and if thin, attenuated edges are left, they are liable to chip off, leaving a rough margin which will collect food, mucus, etc., which will decompose, and cause further decay. In all compound approximal and grinding surface cavities a matrix should be used, as in no other way can the filling be properly condensed. The necessary pressure cannot be brought to bear upon the material unless it is surrounded by strong walls; and as in this class of cavities one of the walls is wanting, it must be substituted by the matrix.

It has been recommended that the interior of the cavity be coated with liquid gutta-percha; but he does not advocate the practice.

The alloy should be mixed with the least quantity of mercury that can possibly be used to amalgamate the mass; it should then be squeezed in a chamois skin, or a piece of kid, to set in a hard cake, so that it can be cut or broken into convenient-sized pieces for introduction into the cavity.

After the cavity has been thoroughly dried with the warm-air syringe, the amalgam, as soon as mixed, should be placed in the cavity and packed hard with suitably adapted instruments; for if it is permitted to stand until crystallisation has commenced, it will be impossible to make a good filling of it, as the mass will not again unite after the crystallising process has once been disturbed. This is one very fruitful cause of failure. The dentist having mixed more amalgam than is needed for one cavity prepares another, filling it with the amalgam left over from the last filling, which by this time has begun to crystallise, and is no longer fit for use. In finishing amalgam the same care and thoroughness should be exercised as if the fillings were of gold ; and this can best be done at a subsequent sitting, after the filling has thoroughly hardened.

The writer does not believe in the necessity of evil symptoms—ptyalism, mercurialism, etc.—alleged to follow the use of amalgam.

DENTAL MATERIA MEDICA—OLD AND NEW REMEDIES.

By A. W. Harlan, M.D., D.D.S., Chicago.

Not yet twenty years ago very few remedies were to be found in the cases of practising dentists. Arsenic, morphia, laudanum, chloride of zinc, nitrate of silver, creosote, carbolic acid, tincture of iodine, chromic acid, Labarraque's solution, tannin, sulphuric acid, aconite, blood-root, alum, valerian, arnica, aqua calcis, camphor, white oak bark, blue vitriol, Monsel's solution, nut galls, krameria, myrrh, oil of cloves, cinnamon, acetate of lead, caustic potash, permanganate of potash, pyrethrum, mustard, peppermint, and a few others, constituted the whole of dental materia medica. Very few dentists made use of all of these. A change has slowly taken place since then, and we find that materia medica has grown. Among additions iodoform, menthol, eucalyptus, $H_2\ O_2$, eugenol, terebin, iodide of zinc, aluminum, chloride, resorcin, cocaine, tonga, cannabis indica, may be named.

We use carbolic acid for its local anæsthetic property, because it is antiseptic, escharotic, stimulant, and styptic. It may be narcotic, but dental surgeons do not use it for such an effect. It may possess other properties in combination with other remedies—such as caustic potash, and glycerine, or water—but it is still on trial in the above combination, and time alone will tell its value when thus compounded. The great need of the present hour is a safe and certain local anæsthetic for obtunding sensitive dentine. Alcohol, glycerine, chloroform, tincture of aconite root, aconitia, carbolic acid, Robinson's remedy, chloral, camphor, and the various preparations of cocaine, cannabis indica, chloride of zinc, menthol, veratria, sulphuric ether, morphine, sulphate of atropia, and iodoform, have been recommended. They must all give way, however, to cocaine and cannabis indica.

Of these he prefers cannabis indica. It should be applied in the cavity after the rubber dam has been adjusted. When the necks of teeth are sensitive, or the gums are tender, they can be benumbed by painting with the ordinary tincture; after which a ligature, or clamp, may be applied without producing pain. To obtund sensitive dentine takes five minutes, and repeated applications. The patient should not be allowed to swallow any considerable quantity, as the medicinal dose is minims v to x. It may do to extract some roots and teeth by using an application like Von Bonhorst's; three to five minutes will suffice in most cases. It is not injurious to the structure of a tooth or contiguous parts. A drop of the tincture injected into a pyorrhœa pocket a minute or two before removal of germal deposits will be found very efficacious; by painting the surface of an abscess, which must be opened a few minutes before introducing the knife, you will find that very little or no pain will be felt.

Literary Notices and Selections.

STUDIES OF THE PATHOLOGY OF ENAMEL OF HUMAN TEETH, WITH SPECIAL BEFERENCE TO THE ETIOLOGY OF CARIES.

By Frank Abbott, M.D., New York, N.Y.

(Concluded from page 38.)

With these questions in mind, I undertook to examine a large number of teeth which had been ground into thin slabs, with the precaution of preserving their soft parts, especially their living matter, a method first introduced into microscopic technique by Dr. C. F. W. Bödecker. The results of my observations, though not exhaustive, are highly satisfactory, inasmuch as they explain, quite positively, the tendency of certain teeth to decay, the cause of which is in direct relation to and dependent upon imperfections in their anatomical structure. I claim, based upon these observations, that certain deficiencies in the minute structure of the enamel must be directly considered as playing a most important part in the etiology of caries.

Before entering upon the description of the anomalies of enamel which I have discovered, I wish to briefly recapitulate the description of the structure of this tissue, and its relation to dentine, as first discovered and published by Bödecker, in his essay entitled "The Distribution of Living Matter in Human Dentine, Cement, and Enamel." (*Dental Cosmos*, 1878–1879). According to this observer, the enamel is composed of rods and fibers of a slightly wavy course, interlacing between which delicate interstices are left. In these interstices run delicate fibers of living matter, sending minute off-shoots in a prevailingly vertical direction into the enamel-rods, thus producing the cross-lines long since known to exist in the enamel-rods, but shown by him to be far more delicate and numerous than ever described before. The square pieces of the enamel-rods are again subdivided into minute fields; they are separated from each other by delicate light interstices, and in all probability contain fibrillæ of living matter. Thus the enamel is raised to the dignity of a living tissue, in place of the former conception of its being a mere calcareous deposit. At the place of junction of the enamel with the dentine a direct connection is often seen between the enamel and dentine fibers. More commonly dentinal fibers run into the enamel varying distances, without a direct union between them and the enamel-fibers; as the latter do not generally reach the surface of the dentine, but terminate above its level, at different heights, while the zone close above their terminations is occupied by a delicate irregular network. In many places the dentinal canaliculi, upon entering the enamel, suddenly become enlarged and form spindle or pear-shaped cavities of varying diameters. They invariably contain protoplasm which is in direct connection with the terminations of the dentinal fibers, and on their periphery with the fibers of living matter of the enamel. In the teeth of young persons the spindle-shaped enlargements are comparatively larger and more regular than in the teeth of old people. The boundary line between the dentine and enamel is usually slightly wavy and with more or less deep, bay-like excavations, the concavities of which are directed toward the dentine.

1.—Anomalous Relation between Dentine and Enamel.

In examining a large number of specimens of ground teeth, I met with formations in two instances which are to be considered as rather anomalous, though not strictly pathological. In one instance, that of a temporary molar, there was on the buccal surface a protrusion of dentine into the enamel with a fluted surface, which was produced by a series of bay-like excavations, present also at the junction of the dentine with the enamel in this tooth in general, but not so marked as in this protruding spot. The centre of this protrusion is occupied by an eccentric protoplasmic formation, differing in shape from the ordinary interglobular spaces. The dentinal fibers at the periphery are bifurcated in the usual manner, but very few of them penetrate the enamel. The portion of the enamel nearest to the protrusion is destitute of prisms, while in the immediate vicinity such prisms were traceable almost in contact with the dentine. The zone immediately above the protrusion was but slighty brownish, whereas the prisms of the enamel exhibited a very distinct brown pigmentation.

In a second case, that of a permanent cuspid, also on the buccal surface near the edge, a protrusion of dentine was observed, occupying nearly one-half of the breadth of the enamel. This protrusion was of a conical shape, and without a distinct boundary, but blended with an oblong field of enamel of quite remarkable structure. The dentinal canaliculi exhibited at their peripheral portions numerous bifurcations, and terminated in numerous small pear-shaped enlargements, many of which could be traced in connection with dentinal fibers, whereas the most peripheral ones, owing to their devious course, looked isolated. The adjacent enamel showed but very indistinct rods, the main mass of the enamel being occupied by brownish globular fields, separated from each other by irregular interstices closely resembling the interglobular spaces of dentine, though of considerably smaller size. The deepest pigmentation and the largest number of such *interprismatic* spaces occured along the periphery of this anomalous formation, especially toward the outer surface of the enamel. The vicinity of the enamel proper was marked by the presence of slightly pigmented rods, more wavy in their course than normal. Toward the dentine the anomalous formation was sloping, and the line of demarcation between the normal and anomalous enamel exhibited either brown and very wavy prisms or small *interprismatic* spaces, decreasing in diameter the nearer they approached to the dentine. I wish to emphasize and call particular attention to the fact that the dentine of this tooth was nowhere traversed by interglobular spaces ; the anomalous construction being confined to the enamel.—*The Dental Cosmos.*

A CASE OF NECROSIS OF THE LOWER JAW.

By L. G. Noel, D.D.S.

On the 3rd of June, 1885, a lady called to have me do something for her little son, a lad about seven years of age who was suffering from toothache. I found the two temporary molars of the lower jaw (right side) much decayed on their proximal surfaces, and at the mother's request, "just to put something in it to give temporary relief," I applied creosote to both cavities ; the boy promising to call in a day or two and have the aching tooth out. I was very busy at the time, and the mother seeming to agree with the boy in his determination to defer the extraction, I yielded so far, assuring her the operation would be necessary, and what I was doing could only afford temporary relief. I did not see the boy again, until summoned by his parents, a month or so later, to see him, with Dr. Dake, who had, in the meantime, been attending him through a severe attack of diphtheria.

I met the Doctor, and learned that my creosote application had done no more good than was expected ; that his toothache recurred on the following evening, and knowing I would be at my residence in the country at that hour, they had taken him to a dentist and had one of the teeth extracted.

Shortly after this he was taken sick; his illness was pronounced diphtheria, and it was in the first stages of his convalescence that I was called to meet Dr. Dake, and relieve him of a swelling of the face, the result of an alveolar abscess (apparently) in the region of the extracted tooth. The parents told me the dentist who had extracted the tooth had broken one root, and left it. They naturally thought the trouble due to this remaining root. I found the first molar loose, and evidently necrosed; pus escapaing upon pressure—everything indicating it as the cause of the recent trouble. It was extracted at once, and I expected to hear no more of the case.

Meeting the father, several days after, I was surprised to learn the swelling had not abated. Thinking the pus had burrowed deeply, from neglect during the boy's illness, I directed them to bring him to me for examination. I found no decrease of the swelling; on the contrary, it had assumed an angry external redness, showing, I thought, a disposition to point in the sub-maxillary triangle, or burrow down further into the neck.

The boy was placed under nitrous oxide gas, and the lancet passed freely down into the pus cavity, making a long slit from the inside of the lip, but outside the alveolar border. A quantity of pus was discharged, and I again indulged the hope that the trouble was at an end. Another week passed without hearing from my little patient, when meeting the father one day in the street, he said, in reply to my inquiry, the boy was not doing well. The swelling was the same, although a continual discharge of pus had been maintained through the lancet opening.

Now, for the first time, I began to suspect necrosis. Telling the father I feared grave trouble, I begged him to call in his most trusted surgeon; and, on the following day, we took the little fellow to the office of the Drs. Eve. It had all along been impossible to make a thorough examination of the case, on account of the exceeding nervous and irritable condition in which the little fellow had been left by his recent vere illness. The surgeon concurring in our view of the case, the boy was placed under ether, with a view to exploring the diseased parts and removing the dead bone, if any should be found. When thoroughly etherized, Dr. Duncan Eve commenced his operation. It had not progressed far, when extensive necrosis of the bone was revealed, and several already detached sequestra were removed. The doctor now expressed the grave fear that we were in for an entire resection of the jaw, but wisely preferring the most conservative possible course. He operated with his gauges and forceps, removing the diseased portions, as they were revealed by the sponges and absorbents, until the entire alveolar portion, including the crowns of several permanent teeth, and a heavy nipping of the body of the bone, had been taken away. Hoping this would suffice, and believing all the diseased portion had been cleared out, we concluded to desist, and await further development. The parts were washed with a strong solution of aromatic sulphuric acid, a carbolic wash and a dressing of iodoform were prescribed, and the boy placed upon a tonic treatment. As soon as he was well enough to be removed, his parents took him to the country.

After the lapse of a fortnight or so, he was brought back to us by his anxious parents, the swelling having continued all the while, with constant discharge of pus. Believing nature to be busy with the work of repair, and seeing no demand for further surgical interference, Dr. Eve merely suggested a wash of parmanganate of potash, locally, and gave another tonic prescription, including chlorate of potash as its salient ingredient. The country resort being within easy reach of the city, an appointment was made to see him again in ten days, and directions given to paint with iodine over the inflamed parts, externally.

At our next examination, we found a distinct pointing of the swelling, like a furunculus, just below the body of the jaw, and behind the point crossed by the fascial artery. The boy was placed under gas, and an opening made with the lancet discharging a quantity of pus. Having thus established a drain from the bottom of the parts, we again hoped the trouble at an end, but our little patient returned to the city ten days ago, with a jaw still greatly swollen, and still discharging through the opening last made. Examination with the finger revealed a hard substance in the bottom of the alveolar cavity, and we appointed the following day for its removal. Believing the operation before us to be very trivial this time, we decided not to etherize our little patient, expecting to grasp a small sequestrium and bring it away easily. Some difficulty was met in seizing it, and when dislodged, it proved an inconsiderable portion of alveolus at the anterior portion of the original wound, and the crown of the permanent canine tooth, which had been thrown up to the surface, and had been a source of much irritation.

We saw the patient again to day, and found great abatement of the swelling, the face rapidly assuming its normal appearance. Tonic treatment was advised to be continued, and we expect soon to see the boy quite well.

Heath, in his work on "Injuries and Diseases of the Jaw," (p. 107) speaks of a character of necrosis sometimes following eruptive fevers, such as scarlet fever, small-pox, and measles. He calls it "exanthematous necrosis." We quote as follows :—

"The disease appears to occur most frequently about the age of five or six years, when each jaw contains the whole of the first set, and the germs, more or less advanced, of the second set of teeth. The disease first shows itself a few weeks after the occurence of the feverish attack, in tenderness of the mouth and fetor of the breath, and the gum is seen to be separated from the teeth and alveolus. The disease is remarkably symetrical, appearing almost simultaneously on both sides of the jaw, and rapidly denuding the bone, thus leading to necrosis, and subsequent exfoliation of considerable portions of it. These usually include the whole depth of the alveolus, together with the partially developed permanent teeth ; but no case has been met with in which the lower border of the jaw was involved. It is possible that this disorder might be confounded with cancrumoris in its earlier stage, but the absence of ulceration of the gum would at once distinguish it."

In many respects, the case we have just described resembles the exanthematous necrosis of Mr. Heath (or rather, of Mr.

Salter, for he it was who first applied this name; vide Guy's Hospital Reports, Vol. IV.), differing in its confinement to one side of the jaw, and in being sequent to diphtheria, which cannot be classed with the exanthematous fevers. Still the question, whether the trouble in the bone was not merely a sequence of the diphtheritic attack, seems to find a ready assent. It is true, the previous diseased condition of the two molar teeth may have determined its location in that part of the jaw, or may have had a controlling influence upon the violence and extent of the disease thus established.—*Southern Dental Journal.*

PATHOLOGY OF ALVEOLAR ABSCESS.*

By W. H. Whitslar, D.D.S.

In no bone or group of bones, arranged for the support or protection of any organ or set of organs in the human body, do we find so vast an array of alveoli as in the maxillary bones of the face. Averaging forty-eight in number, sometimes more and sometimes less, including the alveoli of both jaws, it is from this great number that we have been led to speak of any disease limited by the word alveolar, as that pertaining to any one of the alveoli contained in the alveolar processes of either maxilla. Hence when there occurs within an alveolus an abscess we usually name it alveolar from its position and not its kind.

In the study of the pathology or physiology of alveolar abscess, we learn much of its history when we study life in its simpler forms, and it is for this purpose that a short *resumé* is made in a brief analysis. Therefore we take in view a simple cell, a mere mass of protoplasm, without definite form or organism, and what do we find? We discern, first, that man with his grand combination of bones, muscles, vascular and nervous system, does not exhibit in proportion to size as much energy as that of the ever changing bit of protoplasm; secondly, that the forces which are so apparent in higher life are in all probability the same in the lower. Chemical application cannot detect this, for, when an attempt is made to separate the component parts of so tiny a mass, microscopic in size, the elements which are in so minute quantities cannot be collected into separate vessels without severe disturbing influence interfering, which at once renders the separation impossible. And then too, protoplasm being so complex, all methods of chemical analysis destroy it, and what we analyse is *not* protoplasm, but a mixture of the products of its decomposition. Such a mixture has been called *dead* protoplasm, but that term implies a contradiction since protoplasm is *always* alive. Now man and a simple cell possess in common with inanimate objects many merely physical properties, as weight, colour, and so on, but, there are at least seven well-known features that are recognisable in the life of man in the highest sphere of the animal kingdom and the amœba unknown without the aided eye. These features or qualities are, irritability, contractibility, conductivity, co-ordination, automatism, assimilation, and reproduction ; and at times are especially endowed more than another in certain directions. Of the first, irritability is noticed when foreign bodies come in close contact, which results in movements of the mass from co-ordination of contraction and conductivity. With contraction there seems to be an identity with the muscle movements of our own bodies, that is, the fundamental principles seem to be the same. Conductivity necessarily follows irritability since impingement upon a part not only produces local effects but distant parts co-operate. This is appreciated through our nervous systems. Automatism is action set up in itself, and is dependent strictly upon nutritional powers. The remaining two factors, assimilation and reproduction, are possessed by all kinds of living matter, whether plant or animal. There is, however, an important distinction between the two, and that is, while assimilation is necessary for the maintenance of life, reproduction on the other hand is necessary only for the continuance of a race or kind, and if need be, is possessed only by some of the individuals composing it.

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* Read before the Northern Ohio Dental Association.

All these virtues then are recognisable in the simple cell as well as in man, and why not ? Dissection of our bodies into their histological elements shows that man is but a federation of cells, and that all are arranged with some great end in view ; cells of one kind to perform certain functions, cells of another to accomplish other designs. Every human body commences its individual existence as a single nucleated cell. These cells are soft and granular, with a central portion known as the nucleus, and, a still smaller spot is noticed within the nucleus and is called the nucleolus. Professor Agassiz gives to the granular matter the name of *ectoblast* to the nucleus *mesoblast*, and to the nucleolus *entoblast*. The nucleus is the living part of the cell, and has within it the power of division or reproduction. The outer part is the dead matter which when removed from its source of nutrition is cast off after a certain age. If an epethelial surface be examined, selecting that which is near a blood capillary, we notice that those cells which are nearest the capillary are composed of nucleus matter only, these of course are germinal, and all the future parts of the cell must accrue from them no matter how complex. Examine a little further away and as seen in the diagram the cells have appearing upon their outer edges, a new material forming still further away, this increases in quantity while at the same time the nucleus becomes smaller and smaller until there ceases to exist at all any of the living matter. Growth stops when the weight of egesta equals the amount of ingesta. Finally the entire cell is composed of formed material or effete matter. So much for living matter, its growth, and death ; but what is true of one member of a congregation of cells in life is equally true of the entire number under the same conditions. Hence when we deal with a tooth and its surrounding tissues the same laws govern their retention or expulsion as nature seems fit to choose. Now, coming more directly to the subject in hand, we recognise that an abscess is the result (if not controverted) of inflammation. Inflammation implies much, and its study is one of the most difficult that the surgeon can enter upon.

(*To be continued.*)

Dental News.

VACANCY.

NATIONAL DENTAL HOSPITAL, 149, GREAT PORTLAND STREET, W.

The post of Anæsthetist is vacant. Applications, with testimonials, to the Secretary, not later than January 27th.

DENTAL HOSPITAL REPORTS. DENTAL HOSPITAL.

MONTHLY STATEMENT OF OPERATIONS PERFORMED.

Number of patients attended		2112
Extractions	Children under 14	264
	Adults	745
	Under Nitrous Oxide	387
Gold Stoppings		208
Other Stoppings		644
Advice		160
Irregularities of the Teeth		139
Miscellaneous		300
	TOTAL	2847

H. LLOYD WILLIAMS, House Surgeon.

REPORT OF CASES TREATED AT THE ROYAL PORTSMOUTH, PORTSEA AND GOSPORT HOSPITALS.

FROM JANUARY TO DECEMBER, 1885.

Teeth Extracted	572
Stoppings	3
Advice Cases and Scaling	178
Irregularities of the Teeth treated mechanically	35
Removal of a Sequestrum (child 6 years) Left side Lower Jaw, which formed the alveolar Process, and contained Deciduous Teeth, also the Crown of 6 year molar extending from Symphysis to Ramus	1
TOTAL	786

W. H. KIRTON, L.D.S., R.C.S., IREL., Honorary Dental Surgeon.

BIRMINGHAM DENTAL HOSPITAL.

DECEMBER, 1885.

Number of patients	748
Fillings	201
Miscellaneous	18
Anæsthetic Cases	11
	230

F. HAMPTON GOFFE, L.D.S., ENG. & EDIN., House Surgeon.

British Journal of Dental Science.

No. 433. LONDON, FEB. 1, 1886. Vol. XXIX.

ON CYSTED AND ENCYSTED SOLID TUMOURS OF THE JAWS, WITH OBSERVATIONS ON THE STRUCTURE OF THE ENAMEL ORGAN.*

By S. F. Eve, F.R.C.S.

Pathological Curator of the Museum of the Royal College of Surgeons, Assistant-Surgeon to the London Hospital.

The mode of degeneration of the epithelium is more clearly evident in those tumours in which the cyst formation is well marked. The central cells of the columns and alveoli become much enlarged, finely granular, and the nucleus is pressed against the cell wall. Then the protoplasm of the individual cells becomes merged into a general mass, while the nucleus and the portions of cell wall attached to it remain visible, and have somewhat the appearance of flattened cells with processes lying in the interstices of the degenerated cells. In other instances a drop of colloid substance forms within the cell, by which the protoplasm is expanded into a narrow band, and the nucleus being pressed to one side, the characteristic "signet-ring" form is produced. The approximation of such cells with their nuclei at the points of contact will, as you may readily conceive, give rise to a wide mesh-work. In the layer intermediate between the central and peripheral portions of the columns, the degenerative change is less extensive and the resemblance to the central network of the enamel organ is exact. Vacuoles form at one or more points in the slightly enlarged cells, sometimes separating the nucleus, which for the most part retains its rounded forms, from the cell wall. A kind of solution of the protoplasm takes place, the vacuoles in adjoining cells run together, and finally the nuclei remain connected only by filaments of undissolved protoplasm and the vestiges of the cell walls. Further, in studying with high power immersion lenses some beautiful sections of the rudimentary enamel organ kindly lent me by Mr. Charles Stewart, I observed quite unmistakably "signet-ring" cells, and could in places make out a swelling with hyaline degeneration and vacuolation of the protoplasm prior to the formation of a network. If the epithelial cells were merely compressed by fluid accumulating between them, there would be no swelling of their substance, and in place of the indistinct fragment of the undissolved protoplasm around the nucleus, there would be a well-defined contour produced by the wall of the compressed cell.

Again, having already shown that the pathological products are structurally identical with the developing enamel organ, I contend that since the network in the former is clearly due to colloid degeneration of the cell substance, the same explanation also hold good for the latter; for unity of type is as clearly evident as regards mode of development and structure between pathological formations and normal tissues as between the lower and higher organisms of the animal kingdom, and unity of structure and form is the resultant of similar innate tendencies in the ultimate elements of the tissues, namely, in the cells themselves.

Before closing this portion of our subject, permit me to say a few words on the mode of origin of the multilocular cystic tumours. The inference naturally drawn from their structure would be, that they originated directly from the enamel rudiment of an aborted or supernumerary tooth—in fact, that they are a form of embryo-plastic odontome. But of this there is no evidence, and the age at which they commonly occur is distinctly against such an assumption. Bryck is of opinion, but as I think on insufficient grounds, that the history in his case supported this conclusion.

In some two or three of the twelve specimens which I examined there was distinct evidence that the tumours proceeded from an ingrowth of epithelium continuous with that of the surface of the gum, and in two instances they occupied the margin of ulcerated alveoli from which teeth had fallen out. In another example there were flask-shaped masses of degenerating epithelium extending downwards from the gum between the teeth.

Since these observations were published M. Malassez communicated to the Société de Biologie of Paris * the result of the examination of a normal maxilla, carried out with the view of ascertaining if epithelial structures persisted in the neighbourhood of the alveoli, from which the cystic tumours of the jaws might originate. His search was rewarded by finding spherical, oval, and cylindrical masses of epithelium within the peri-odontal membrane (alveolo-dental ligament), and extending from the gum to the apex of the fang, but chiefly distributed below the neck and at the upper part of the root. These masses, he thinks, proceed from some of the epithelial formations accompanying dentition, probably from the external layer of the enamel organ. In this fact we have very strong confirmation of my observation above alluded to, and an explanation of the circumstances that these tumours usually begin near alveoli, soon lead to the extrusion of teeth, and that their interior often communicates with the mouth by an open alveolus.

In conclusion of this portion of our subject I beg to submit that the multilocular cystic tumours represent a distinct variety originating from epithelial ingrowths around the dental alveoli, possibly (if I may be allowed to indulge in a harmless speculation), in ingrowths the sole representatives of teeth long since suppressed in the process of evolution of our species, or from an overgrowth of the normal epithelium of the gum; a variety of tumour owing its peculiarities in structure and secondary metamorphosis to the inherent developmental peculiarities or tooth-forming properties of the epithelium from which it springs. It belongs to the group of epitheliomata, and possesses a decided, although not a high, degree of malignancy—facts which I endeavoured to prove in the lecture before alluded to. General dissemination of the tumour throughout the system may even take place, and the frequency of recurrence is now placed beyond doubt by cases cited by Mr. Heath in the recent edition of his "Injuries and Diseases of the Jaws," a work which may

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* "Journ. Soc. de la Biologie," 1884, p. 242.

almost be considered as the foundation of our knowledge of tumours of the jaws. In one of these cases the disease appeared on the cheek as "a typical epithelial ulcer."

Clinically resembling but differing pathogenetically from the multilocular cysts, is this, I believe, unique specimen of single cyst occupying the whole of the right side of a jaw.* It contains no trace of a tooth, and the structure of its wall shows that it is not dentigerous or follicular in the strict sense of the term, for I found that it was lined by a thick layer of small round epithelium. I have hazarded the conjecture that it may have originated from the expansion of a rudimentary enamel organ owing to the collection of fluid in its interior.

I will now with your permission pass on to the second part of my subject, and will bring to your notice one or two remarkable examples of encysted tumours of the jaw, that is, of solid tumours which, having expanded the walls of the jaw, are enclosed by a bony capsule. I need scarcely remind you clinically there is at times considerable difficulty in distinguishing such tumours from cysts or cystic tumours. Their external appearances are often similar, in both the parchment-like crackling may be obtained, and, in many cases, a diagnosis is impossible without the aid of a puncture.

For these reasons, and from the fact that they may both be connected with anomalies in the development of the teeth, it may not be disadvantageous to place them in juxtaposition.

All the varieties of tumours of the jaws, with the exception of the osseous and cartilaginous, may be more or less definitely encapsuled or encysted. The fibrous and fibro-sarcomatous, sarcomatous, central myeloid tumours, odontomata, and lastly, solid epithelial tumours having no relation as regards their origin with the tubular carcinomata of the superior maxilla which spring from the epithelium and glands of the palate and antrum.

The specimens I am about to describe are at least closely related to, and should, I think, be classed among the odontomata. The odontomata, as you are well aware, were divided by Broca in his classical essay into odontomes embryoplastique, odonto-plastique, coronaire, and radiculaire.

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* Royal College of Surgeons' Museum, No. 2194.

In the class of embryo-plastic odontomata, Broca includes all encysted sarcomatous and fibrous tumours of the jaws, which he regards as the product of a tooth-rudiment in its earliest stage of development.

The odonto-plastic odontomata are tumours of which the tissues have reached a higher stage of evolution. They are either surrounded by a layer of odontoblasts, or have become more or less completely dentified. The distinguishing characters of the coronary and radicular odontomes do not concern our present subject.

Case 1.—A very curious and, I believe, unique tumour came under my notice while I was Surgical Registrar in St. Bartholomew's Hospital. James B., aged twenty-four, was admitted to Henry Ward, under the care of Mr. Thomas Smith, with a swellling on the outer surface of the left side of the lower jaw. He first observed a prominence four years and four months previously, and for a year and a half before that had suffered pain in the part. For the first six months there was a discharge from the gum over the swelling. Eighteen months after the first appearance of the tumour two healthy teeth, situated in the affected part of the jaw, were extracted, and another at a later period.

The swelling had not increased during the last three years, and was not painful.

Condition on Admission:—A hard, rounded swelling, about three-quarters of an inch in diameter, projected from the outer surface of the lower jaw at the level of the molar teeth; the corresponding portion of the inner surface of the jaw was slightly thickened. No crackling but slight and hardly perceptible yielding could be obtained by firm pressure over the tumour. A slit-like ulcerated aperture opened on the alveolar surface of the tumour, into which a probe could be passed for some distance. His dentition was very irregular, the full complement of teeth having only existed in the left superior and inferior maxillæ. In the right superior maxilla the canine and second molar, and in the right inferior maxilla the canine and first bicuspid, were absent.

The operation was delayed for a time on account of an attack of inflammation of the jaw, with much swelling of the cheek, which came on immediately after his admission.

Operation :—An incision having been made along the lower margin of the ramus, the tumour was exposed by reflecting the cheek.

Its outer wall was removed with bone forceps, and a cavity, about an inch and a quarter in diameter, and filled with a pale pinkish fleshy growth, was exposed. The growth was scooped out and was not adherent to the walls, which were smooth and glistening.

The cavity was plugged.

The subsequent progress of the case was perfectly satisfactory.

Mr. Mudge of Hayle, Cornwall, the patient's medical attendant has kindly informed me that when last heard of, more than two years after the operation, the man was in excellent health, and there was no return of the tumour.

The minute structnre of this tumour presents many interesting features. It was composed almost entirely of small compressed or angular epithelium, in parts (as shown in the accompanying rough sketch) arranged in anastomosing bands which often enclosed rounded spaces, or terminated in club-shaped ends. Occupying these spaces, and sparsely distributed through the tumour, was a gelatinous fibrillar connective tissue containing branched and round cells. In one section I observed two parallel bands of very large elongated columnar epithelial cells, separated by a narrow band of epithelium having the peculiar characters of those forming the central layer of the enamel organ. Scattered at wide intervals were bands of curiously modified connective tissue composed of long clearly defined slender fibrils, and lines formed by the juptaposition end to end of excessively slender and much elongated fusiform cells. The fibrils lines were parallel and separated by a clear ground substance. There was no evidence of cyst formation in the tumour, and but slight traces of degeneration of epithelium. The relation of the various tissues composing the tumour to those of a rudimentary tooth will be, I think, at once apparent from the accompanying sketches. Both the form and mode of growth of the epithelium is suggestive of the enamel rudiment, and the solitary band of columnar cells with the intervening network can scarcely be regarded otherwise than as an evolution of the epithelium in the direction of enamel formation. The gelatinous connective tissue likewise suggests the structure of the tooth papilla ; while the bands of fibrils may be considered as a modification of connective tissue in the direction of the formation of dentine. If I am correct in believing this to be the case, the specimen throws some light on the mode of formation of dentine, for the fibrils are clearly the product of elongated fusiform connective tissue cells, the intervening substance being of the nature of an intercellular matrix. This seems the more probable as it places the formation of dentine on the same lines as that of bone ; the bone lacunæ, and the dentine fibrils are both modifications of connective-tissue cells, and the ground substance is produced by calcification or dentification of the intercellular substance.

A CASE OF A BROKEN PORTION OF A TOOTH FORCEPS IMPACTED IN THE AIR PASSAGES AND SUCCESSFULLY REMOVED BY TRACHEOTOMY.*

By Sir William MacCormack, F.R.C.S.

The patient was a young woman, aged twenty-four, a domestic servant, who applied to Mr. J. H. Sanders, of Barnstaple, for the purpose of being fitted with a denture. On examining her mouth, Mr. Sanders found a number of unhealthy stumps in the upper jaw, and advised their removal. To this the patient consented, but begged to be allowed to take chloroform. The anæsthetic was accordingly administered by Mr. Jackson, a surgeon of Barnstaple, and Mr. Sanders extracted several molar roots on the right side. He then took up a pair of bicuspid forceps and tried to extract the right upper second bicuspid, but met with an unusual amount of resistance and the forceps slipped. He reapplied them and was about to make another attempt, using a little more force, when the palatine blade of the forceps suddenly broke off close to the joint and disappeared. The patient at once showed signs of impending suffocation, with extreme dyspnœa and lividity, and appeared for a time as if moribund. Artificial respiration was at once resorted to, the patient was inverted, and every effort made to relieve her of the fragment which had evidently passed into the air passages; but though the dyspnœa passed off after a time, all efforts to obtain the expulsion of the foreign body proved fruitless.

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* Read before the Odontological Society of Great Britain.

During the next five or six weeks the patient remained without any very urgent symptoms, though she suffered from pain to the right of the sternum, opposite the second and third intercostal spaces, together with constant spasmodic cough and bloody sputa, and she began to lose strength. At last, seven weeks after the accident, she was sent up to London and admitted into St. Thomas's Hospital. On stethoscopic examination râles were to be heard all over the right lung and a peculiar rasping sound at a point to the right of the sternum where the patient complained of pain. She had constant cough and dyspnœa, was unable to sleep at night, and was evidently getting rapidly worse. There could be no doubt that the foreign body was impacted in the right bronchus, and that there was little or no chance of its being expelled by coughing. It was therefore determined to attempt its removal by tracheotomy.

Accordingly, on November 26, being the third day after her admission, chloroform having been administered by Mr. Tyrrell, Sir William MacCormack made an incision down the middle line of the neck from just below the cricoid cartilage to the sternal notch. Ligatures were placed round the isthmus of the thyroid body, which was divided between them, and an opening nearly 2 inches long made in the trachea. This was kept patent by means of silk threads, and forceps passed down. The left bronchus was found to be clear, but in the right a hard obstruction was met with at a distance of about 5 inches from the opening, and rather more than an inch beyond the bifurcation of the trachea. On passing down a bullet probe the characteristic ring of steel could be distinctly felt. Attempts were now made to remove the foreign body with the forceps, but for some time without success, owing to its smooth surface and wedge-like shape, as well as its firm impaction. Other forceps were tried and then a wire loop, but still unsuccessfully. At last, some silk having been wound round the blades of the forceps, a better grasp was obtained, and the fragment, which was fully an inch in length, was seized and withdrawn.

Slight hæmorrhage followed, but Sir William MacCormack decided to closethe opening. The patient was at once relieved, and althoughsome slight local broncho-pneumonia followed, it soon passed off, and ten days after the operation the temperature was normal and the patient made an excellent recovery.

Sir William MacCormack added that most certainly no blame could be imputed to Mr. Sanders; the forceps bore the well-known name of " Evrard," and there were no external indications of any flaw.

DENTAL ANÆSTHETICS.*

By A. T. Croucher.

Before proceeding te discuss the merits of the various dental anæsthetics, it may be as well to consider the physiological effects of anæsthetics in general. The nerve centres are paralysed by the inhalation of anæsthetic vapours, in a certain order. First the cerebrum is affected, thus destroying volition, so that action is no longer designed or controlled by the intelligence of the individual; but when in this condition, if a sensory nerve is irritated, reflex muscular action will be produced, as in the case of the unconscious wink of the eyelid if the conjunctiva be touched, or the unconscious withdrawal of the finger if pricked, or the unconscious struggle if severe pain is inflicted; in all these acts, the patient's brain is not aware of the touch, nor does he remember it, but his reflex apparatus is intact, the struggle or scream may be exactly synchronous with the injury, but they are not directed by the will of the patient. In the second stage the sensory centres of the cord are paralysed, after which movement is erratic, and irresponsible, even to a sensory stimulus ; twitchings of the extremities, opisthotonos, rolling of the eyes, and other muscular phenomena may occur, but they are quite independent of anything that is done to the patient. In the third stage, the motor centres of the cord are affected, after which movement ceases, nothing remaining at work but the cardiac and respiratory centres, there being no movements except those essential to life ; this is the most favourable moment for operation. The last stage is that in which the sensory and motor centres of the medulla are affected, after which respiration, the heart's action, and all functions of life cease, and the person becomes, as we term it, dead. But if this last stage is not arrived at, and the anæsthetic is discontinued, the various centres will recover their powers, but is an inverse order to their failure. Having thus briefly gone over the physiological aspect of anæsthetics, I will now return to their practical application. I purpose beginning with that which is in most frequent use with us, namely, nitrous oxide gas. This gas was first discovered by Priestly, towards the close of the 18th century, and Sir Humphrey Davey discovered that it possessed anæsthetic properties about the year 1800, but no one at that time seems to have acted upon his suggestion that it might be valuable in surgical operations. It was not till the year 1844 that Horace Wells, a Connecticut dentist, having observed its anæsthetic property, reduced it into practice, by administering it in his own surgery, but on account of imperfections of the apparatus, these early trials proved rather unsatisfactory, and Horace Wells departed this life without reaping any benefit in this world, at any rate, from his enterprise ; and for a time after his death, protoxide of nitrogen was disused and forgotten. But from this obscurity it was rescued in America by Dr. Q. D. Colton, and an American dentist was the means of reviving it in our own country. On the 31st of March, 1863, Dr. T. W. Evans, of Paris, having then recently brought over nitrous oxide to this country, exhibited its anæsthetic properties at the London Dental Hospital, and did everything in his power to assist the profession in further experiments with it. Committees, etc., were promptly appointed to investigate and report on the subject, and in 1872 a full and favourable report was published. Since that time it has come into every day use, and many thousands of persons having experienced its benefit; but we must not forget that we owe its use, revival, and introduction into this country entirely to American dentists — Horace Wells, who first used it, Dr. Colton, who revived it in America, and Dr. Evans, by whom it was introduced into this country, being all American dentists. Nitrous oxide may be readily prepared for use by heating two or more pounds of nitrate of ammonia in a glass flask, the gas which is generated first passing through a bottle containing water, then through a solution of protosulphate of iron (3 oz. to $1\frac{1}{2}$ pint) contained in another bottle, and finally through a solution of caustic potash (1oz. to $1\frac{1}{2}$ pint) contained in a third bottle; the chief precaution necessary, as some of you I daresay have found out ere this, is to see that the heat is gradually applied and evenly maintained; but, as a rule, private practitioners have their gas supplied to them by various firms in the liquid form in wrought iron vessels, which is certainly much more convenient than making it themselves. Nitrous oxide is the quickest and safest of all the anæsthetics, and its after-effects are usually so slight that they are hardly worth mentioning; but although this is so, it is at the same time one of the most difficult to administer really well. In order to obtain its full effects, it should be administered pure, all air being rigidly excluded. Its administration is attended with hardly any appreciable discomfort to the patient save in a few exceptional cases, and the risk to life is so small, that it may be said that if a cardiac condition existed which rendered nitrous oxide a dangerous agent, the extraction of a tooth, without an anæsthetic, would be still more dangerous. The administrator of the gas should have nothing whatever to do with the operation, his undivided attention being bestowed upon the patient's condition; and in no case should the operator himself also administer the anæsthetic. In one case when this was done, the patient died during the extraction of a tooth, the operator being unaware of it, while if a competent administrator had been present, he would have noticed something to have been wrong, and taken measures to correct it, by stopping the operation, pulling forward the tongue and forcing the patient to take a full, deep inspiration, and all would have been well, and even if death had occurred, not an atom of blame could then have been attached to the operator. I think that it is quite as well that the gag should be placed in position by the operator ; it will then be his own fault if it is in the way during the operation, but the anæsthetist or some other competent person should always be ready with Mason's adjustable gag, in case that the ordinary gag slips, or that the operator desires to operate on both sides at one sitting. Mason's gag is considered to be the best of the adjustable gags, and one should be chosen in which the handle is long and the curve not too great ; it is also important that when the beaks are shut and the handles fully extended, the latter should not be so far apart that they cannot be fairly grasped with one hand. The chief points required in the ordinary gag are, first, that it should take up as little room as possible ; second, that it should be firm in the mouth ; and third, that it should be easily cleaned. Those in use at this hospital, made of hard rubber but having soft rubber vulcanised at each end, fulfil these conditions as nearly as possible, and are quite as serviceable as the more complicated ones. Spring gags are the most to be relied upon for keeping firm in their position in the mouth, but the more complicated an apparatus is the more likely it is to be fractured, and this has been attended with a fatal result in one case ; therefore, it is better to stick to the simpler pattern. A gag should never be used singly, but should be attached by a strong red silk to another one to prevent the possibility of it being swallowed. It is unwise in any case where it can possibly be avoided, to place the gag farther forward than the first bicuspid, as in a case where the gag rested on the central only, as soon as the patient became unconscious the mouth closed and the tooth was forced right out of its socket ; and in another case, under similar conditions, an isolated canine was forced out of its socket. If it is impossible to avoid placing the gag between the front teeth it should be placed between the incisors, not the canines, as these latter are never supplied with much alveolus. The gag should also involve more than one tooth in each jaw. Of course, the greater the projection of the front teeth the greater is the danger of their being forced out of their sockets, and, therefore, the greatest care should be taken. Where the teeth have been lost and it is desirable to place the gag upon the gums, a cork, with a depression made at each end by means of rather a large half-round file, will often be found more acceptable to the patient than anything else. It is rather dangerous to pull away the gag and operate without it as some rather severe bites have resulted from this practice in nitrous oxide cases, but the muscular contraction when ether is administered renders this less important. When the prop is in position the patient should be directed to contract the mouth. This not only, by likewise closing the jaws, renders the position of the prop more secure, but also permits the face piece when applied the more perfectly to include the mouth and nares. It should be ascertained before giving the gas that the patient has nothing in his mouth that is liable to become loose and be swallowed, such as artificial plates, pivoted teeth, etc. ; also, all collars, bands, etc., about the neck and waist, in fact, anything that prevents full and easy respiration should be loosened. It is better to avoid any admixture of air with the gas during inhalation, not because it produces excitement, but because it weakens the effect of the gas, and, therefore, time is wasted in getting the patient under the influence of the anæsthetic. The face piece should be a good one. Clover's is considered to be as good as any. It should be seen that the air cushion is perfect, and this latter should be blown out to its full extent ; except in cases where the patient is blest with a very prominent nasal organ, for then it would simply rest on the prominent bridge, but if a little air is let out it may then be fitted to either side of it, and thus prevent the ingress of air. It is as well that the administrator should try the face piece on himself first, to see that it is in perfect working order. Some operators use a supplemental bag in connection with the face piece, while others prefer it without. One great advantage in its use is, that while it continues to be emptied and refilled there is ocular demonstration that respiration is being conducted in a satisfactory manner, and if, as often occurs in the early stages of the administration, the patient holds his breath, the operator at once detects it by the condition of the supplemental bag ; in such a case he should direct the patient to breathe outwards, when the expiration being followed by an inspiration, the inhalation will proceed in a satisfactory manner.

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* Read before the Students' Society of the Dental Hospital of London, at the annual general meeting held Jan 18th, 1886.

(*To be Continued*).

NECROSIS OF THE LOWER JAW.

A Translation of a Clinical Lecture.

By M. Trelat,
of the Hospital de la Charité.

I shall have to operate on two young patients who are both suffering from almost identically the same lesion, a spontaneous traumatic necrosis of the lower jaw. One is a boy of ten and the other a little girl of four.

A year ago the former of these two fell out of a carriage and sustained a rather severe contusion of the lower jaw. Soon afterwards a slight swelling made its appearance beneath the symphysis of the chin, an abscess formed, gave exit to pus and was followed by a permanent fistula.

Last January a second fistula formed and gave issue like the first to a quantity of sero-purulent matter ; so that now a small fistula was to be found on either side of the symphysis. On the 25th April a third small collection of pus was discovered and this again burst in the course of time. In short, at present, this child, who appears to be in the best of health, has three fistulas below the jaw ; one is a blind one, the two others on the contrary lead directly down to the lower posterior border of the denuded maxilla which contains a few sequestra.

The little girl's history is as follows :—Last October, twelve months, she fell and knocked her right cheek against a wall. The subsequent symptoms were pain, redness, then a swelling on a level with the right gingival furrow, and the formation of an abscess which spread into the mouth, and gave exit to a large quantity of pus. A fistula remained, which was still present when I saw the child for the first time, three months afterwards. The gum was in a fungoid condition. The fistula in the gum was large, and at its base bare bone could be seen. A short time after the fistula closed, but a new abscess soon formed in the same place ; this burst, and gave issue to a quantity of pus, and a sequestrum two centimetres long by one wide. The wound closed again, and the same symptoms reappeared, swelling, heat, redness, pain, abscess, flow of pus, elimination of several sequestra, and this time a fistula appeared not far from the lobe of the ear.

The child has just been brought to me in the following state: General health good, gums in a fungoid condition and very much swollen, no present fistulous tract ; a fistula below and a little in front of the lobe of the ear, a probe introduced into this opening comes down upon a sequestrum. The canine and the two right incisors are loosened, the first molar tooth has been lost ; all the others are sound.

To sum up, here we have two patients in whom the lesion is the result of a contusion from a fall, and is characterised by swelling, redness, pain, the formation of an original abscess followed from time to time by inflammatory attacks, a series of abscesses, the formation and elimination of sequestra, fistula, etc.

Necrosis of the lower maxilla, as a result of a contusion, is not a very common affection. More frequently it takes the form of a syphilitic or phosphorus necrosis, but in the present case neither of these causes comes into play ; I may add, by the bye, that cases of phosphorus necrosis seem to be getting more and more scarce.

Whilst on the subject of necrosis, I will also mention that form which especially affects childhood, though it is occasionally met with in early adult age, *i.e.*, necrosis from dental causes, whether it occurs in children at the time of milk dentition, or in adults at the eruption of the wisdom teeth. Finally, we also meet with instances of necrosis of the lower jaw, due to the exanthemata, and which occur as a sequel to measles, scarlatina, and typhoid fever.

Why should traumatic causes be more likely to lead to necrosis of the lower jaw than of any other bone? If we examine the osseous tissue of the lower jaw, we are struck by its smooth eburnated appearance in the greater part of its extent, and its low vascularity. There is a dental artery, but it is destined rather to supply the teeth and the dental pulps. Moreover the lower maxilla is very superficial, and, therefore, much more liable to injuries which may lead to osteo-periostitis, from loosening of the periosteum. The insertion of the teeth, which may be diseased, is another predisposing cause to necrosis.

The prognosis depends upon the seat and extent of the mischief. A question presents itself here: Is it always possible to remove a sequestrum of the lower jaw through the mouth? No! That depends upon circumstances. If the necrosis is very extensive, if the alveolar periosteum is torn, the sequestrum will have a tendency to escape through the mouth, and its removal through the mouth will be an easy matter. But if it is seated on the lower border of the jaw, it will not be possible to operate in the same way.

In the case of the little boy I shall be obliged to make an incision outside the mouth in order to get at the sequestrum. This is of less importance in the case of a boy than in that of a girl. I am not quite certain what course I shall have to adopt in the case of the girl, for one of her abscesses has already given issue to gingival sequestrum, and though this issue is closed, she has another fistulous tract, which opens just below the ear. Before deciding, however, I shall put the child under chloroform, and carefully examine the wound again. I fancy, however, that in this case also I shall have to make an incision outside the mouth, owing to the position of the sequestrum, which lies at the posterior border of the jaw, not far from the ear.

ANÆSTHESIA AND DENTISTS.

By DR. TH. DAVID, Director of the Ecole Dentaire of Paris.

In a previous article * I exposed my views on this subject and came to the following conclusions:—

1. Anæsthesia is to be looked upon as one of the major surgical operations which, by the terms of the Law of Ventôre, are only to be performed by doctors of medicine.

II. *Officiers de Sante* are only entitled to administer anæsthetics under the guidance and in the presense of a Doctor of Medicine.

III. No one can pretend that an operation which even *Officiers de Sante* are not allowed to perform can be considered to form part of the practice of the dental art, and be permitted to people who possess no medical qualification of any kind.

IV. Dentists who do not hold a diploma and who administer anæsthetics alone, incur the penalties edicted against illegal practice of medicine (Art. 35 and 36 of the Law of Ventore au XI.), and in the event of an accident the penalties edicted by Article 319 of the Code Pénal for accidental homicide (*homicide par imprudence*).

The question has just been settled in a court of law. A few extracts of the judgment which now fixes the law on the subject may not be without interest. It agrees in all points with the conclusions we had arrived at, and it even goes so far as to quote our opinion.

TRIBUNAL CORRECTIONNEL DE LA SEINE (FE CHAMBRE).

Homicide through carelessness—Anæsthesia by means of Nitrous Oxide Gas—Death of the patient—Sentence.

Considering that it has been shown in the course of the inquiry and trial that on the 25th of November, 1884, M. Lejeune went to Duchesne's for the purpose of having a tooth extracted—that at the patient's request the dentist made him inhale nitrous oxide gas for the purpose of rendering him insensible during the operation—that as a result of these inhalations Mr. Lejeune had a syncopal attack and died; considering that for this operation Duchesne made the mistake of not having a Doctor of Medicine to assist him—that for the administration of nitrous oxide gas it is absolutely necessary that the operator should possess a thorough knowledge of physiology so as to be able to examine beforehand, and with great care, the state of the organs of the patient who desires to be anæsthetised—that whatever may be the experience of the accused, an experience which may have sufficed in most of the cases but not in all, Duchesne appears to be lacking in special knowledge, and that he is neither a Doctor of Medicine nor an *Officier de Sante*, though he falsely assumes the title of Doctor of Medicine.

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* *Gazette des Hopitaun*, 1885.

Considering that one of the medical experts appointed by the tribunal, Dr. Brouardel, who gave evidence at the trial, considers that for the administration of anæsthetics two competent persons are required, one of whom should be a Doctor of Medicine, and that it is most imprudent to administer an anæsthetic, as did Duchesne, without fulfilling these conditions.

Considering that if, of all surgical operations, the extraction of a tooth may be looked upon as an operation usually of slight importance, and which only requires some dexterity of hand and may be thus performed by any dentist, even one who holds no diploma, the case is not the same when the operation is performed during anæsthesia—that in the latter case, according also to the opinion of the experts, it belongs uncontestably to the class of major operations that under these circumstances, according to the provisions of Article 29 of the Law of Ventore au XI, *Officiers de Sante*, and with still more reason dentists who hold no diploma, have no right to perform it except under the superintendence and in the presense a of doctor.

Considering, also, that the present director of the *Ecole Dentaire de Paris* does not hesitate to acknowledge that the help of a doctor is absolutely required during the administration of anæsthetics by dentists.

That it thus appears from all that precedes that Duchesne in November, 1884 through his imprudence, negligence, or non-observation of the laws, was guilty, unintentionally, of homicide on the person of M. Lejeune, a misdemeanour foreseen and punished by Article 319 of the *Code Pénal.*

As regards the damages claimed by the *partie civilie* (relatives).

Considering that the death of M. Lejeune must be looked upon as due not only to Duchesne's fault, but also to the imprudence of the victim himself who made the mistake of requesting to have an anæsthetic administered to him without having previously consulted his ordinary medical attendant, and without requiring the assistance of any doctor,

For these reasons condemns Duchesne to pay a fine of 600 francs, and also to pay to the widow of Lejeune the sum of 3,000 francs as damages.

Note.—In France the medical profession is divided into two classes, the *Docteurs en Medicine* and the *Officiers de Sante. Docteurs en Medicine* correspond to our fully qualified general practitioners (not to our M.D's), and are entitled to practice every branch of the healing art in any portion of the French dominions. The *Officiers de Sante* on the other head form an inferior branch of the profession, and are licensed to practice medicine, midwifery, and minor surgery, but only in the department in which they obtained their diploma; they might in a certain sense be compared to those who practice on the strength of the L.S.A. alone.

A Dentist Appointed Justice of the Peace.—Mr. John Caldcleugh, L.D.S., has been appointed upon the Commission of the Peace for the City of Durham.

Among the candidates who passed their final examination for the membership of the Royal College of Surgeons of England on Jan. 2 [illegible] we are pleased to see the name of Mr. Morgan Hughes, L.D.S., Eng. Mr. Hughes belongs to the firm of Rymer and Hughes, of Croydon.

British Journal of Dental Science.

LONDON, FEBRUARY 1, 1886.

FAINT PRAISE.

English medical periodicals of the present day may be likened to the enlightened twelve, who habitually sit at a "Crowner's 'Quest." In each case the zeal of the individual exceeds discretion and haply leads into a display of ignorance. The intelligent greengrocers and chandlers are summoned to state how such and such a one came by his death; they duly deliberate, and then are good enough to append a censure of some one, a censure which they have no earthly right to bestow. One is struck when reading certain journals, whose fat casing of advertisements encloses a somewhat puny body of original matter, by their *ex cathedra* utterances upon all subjects—from the health of a premier to the pernicious habit of nursing cats, since cats have assuredly spread the contagion of scarlatina. It may be said of them as it was of the illustrious Dr. Whewell, that "omniscience is their foible." To those who know the influence which the "doctors' paper" exerts even outside the circle of the mature "Bob Sawyer's" and "Benjamin Allen's," it becomes a matter of surprise that the responsible members of the literary staff should not see that technical questions are handled only by men who understand the subject. It is positively ludicrous to find, for example, dental subjects entrusted to the hands of a medical practitioner who has received the ordinary training for his medical diploma. He may know the time of eruption of the permanent teeth, or he may not. Our experience of medical students goes to show that they are entirely ignorant of dental matters; they "pick up" certain facts and these usually "are revealed" to them after they have become qualified, and have been let loose on some parish; they then learn that babies are supposed to suffer all kinds and descriptions of maladies because "of teething." They had probably during their students' days acquired the art of snapping off the crowns of teeth in their vigorous efforts at extraction, and with these scanty materials they hold themselves competent to deal with the parochial grinders. But it becomes a different matter when we find the press served by writers whose utterances on dental matters are erroneous and reveal crass ignorance; it becomes time to suggest that some of the many dental surgeons who can wield the pen as well as the forceps should be asked to supervise the paragraphist's work when they deal with dental matters, and so avoid statements being put forward which are, at least, misleading. But not only do we find these blunders rife in the pages of our medical contemporaries, but we also are frequently amused to see the condescension which hails our little undertakings. The position of the dental profession in England has advanced too far towards consolidation to thank medical quill-drivers for faint praise or patronising plaudit.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.—The following members were elected as officers and councillors for the year 1886, at the annual meeting, Jan. 11th, 1886. President, T. Charters White; Vice-presidents: (resident) George Gregson, Henry Sewill, S. J. Hutchinson; (non-resident) Richard White (Norwich), Andrew Wilson (Edinburgh), Richard Rogers (Cheltenham); Treasurer, James Parkinson; Librarian, Felix Weiss; Curator, Storer-Bennett; Editor of the *Transactions*, Frederick Canton; Honorary Secretaries, David Hepburn (Council), Robert H. Woodhouse (Society), Willoughby Weiss (for Foreign Correspondence); Councillors (resident), Wm. St. George Elliot, Augustus Winterbottom, Samuel Cartwright, Morton A. Smale, J. Howard Mummery, Arthur S. Underwood, C. J. Boyd Wallis, E. G. Betts, J. F. Corbett; (non-resident), W. E. Harding (Shrewsbury), Robert Reid (Edinburgh), J. R. Brownlie (Glasgow), J. H. Whatford (Eastbourne), F. H. Balkwill (Plymouth), George Brunton (Leeds).

Abstracts of British & Foreign Journals.

MONATSSCHRIFT DES VEREINS DEUTSCHER ZAHNKUNSTLER.

EPILEPSY CURED THROUGH THE EXTRACTION OF A TOOTH.

By Dr. Liebert, Sagen.

The two following cases communicated by Dr. Liebert, of Sagen, are curious and interesting, particularly as such cases have rarely been published. The first was that of a young man, of 25 years, Emil Schultz. He was well built, tolerably strong, and descended from healthy parents. Indeed, in no member of his family was there any sign of any nervous disease, and up till 1883 the patient was perfectly healthy; he was also very temperate. In February of that year he became subject to fainting fits, which seized him while employed at his work in a cloth manufactory, at which times he was obliged to sit down or support himself to prevent his falling to the ground. At first these attacks lasted only for a few minutes, after which the sufferer was quite well again, but sometimes the seizure produced complete unconsciousness, causing Schultz to fall to the ground and to lie stiff. He attributed these attacks to overwork, as they chiefly occurred at times when he had worked 16 or 18 hours at a stretch. Acting upon this, he regularly put aside his work, but without diminishing his trouble to any important extent. On the 4th April, 1883, the unfortunate man met with an accident while at his work, his right hand was badly torn by one of the wheels in the machinery, and this was some weeks in healing. During this time Schultz remained perfectly free from the attacks.

After his hand was healed and he left the hospital, they re-commenced, and this time Schultz attributed them to exposure to the air, as when he left a warm room and exposed himself, he was sure to have a fainting fit and become unconscious.

In April such a severe attack occurred that a physician was called in for the first time.

The physician found him a quarter-of-an-hour after the beginning of the attack perfectly unconscious, most of the muscles cramped, the pupils half distended, no reaction to lights; after the attack somnolence, and a fresh wound apparent in the tongue. Upon enquiry it was fouud that at the moment the attack came on, a feeling of irritation or itching was felt in the tongue, confined to the paint and the front half, depriving the sufferer of the use of the tongue for the time, the most he could do was to form the words "Yes" and "No" and this with great difficulty.

This condition continued sometimes for a few seconds or minutes and passed away without coming to an epileptic attack. But as this condition of the aura increased, the tongue was drawn back or made other aimless movements. After the seizure of 25th of April, symptoms appeared which bore unmistakable signs of epilepsy. Schultz took the customary doses of bromide of potassium for some weeks without any visible effect. In June the patient went to Dr. Liebert, complaining that the attacks were more frequent and more violent. He suffered from toothache also. Upon examination, there were two slight wounds in his tongue. Most of the carious teeth caused pain. Of these the four lower incisors on the left were, according to Schultz, the chief causes of pain, and these were extracted.

From that moment the attacks of epilepsy, with the attendant symptoms of itching of the tongue, &c., ceased after having gone on with some interruption for the space of four months. Up till the present time, two years later, no attack has occurred. Besides this, Schultz has never since suffered from toothache.

The second case was that of a cabinet-maker, Wennesstrám, a man of 35, tolerably strong, who was seized by an epileptic fit on the 3rd Feb., 1862, and which recurred daily afterwards with increasing severity. By the 5th March the attacks numbered 23.

In consequence he was, in March, conveyed by a charitable ociety in Berlin to a hospital (Trauteschen Station) where the attacks continued daily and with sufficient degrees of severity.

The patient had formerly never suffered from any illness nor, indeed, from anything but a periodical attack of toothache. After repeated enquiries, he remembered that since December, 1871, sometimes he lost the use of his tongue for a few seconds or a minute at a time, but it so quickly passed off that he hardly perceived there was anything the matter with him. Later on, while at work, he suddenly, and without premonitory symptoms, felt the sensation of itching of the tongue in a very exaggerated degree, the tongue moving towards the right side and making backward motions. Following upon this, he was attacked by symptoms, the epileptic nature of which could not be doubted. The patient underwent the usual treatment for epilepsy, and Dr. Liebert, finding nothing abnormal in the condition of the tongue, thought it advisable to seek for some other cause of irritation of the nervous system in the vicinity of that organ. With this object he extracted, on the 13th March, the three upper molars, two of which were carious, and caused paid sometimes, though in a slight degree. Immediately the patient felt relieved, as from a great oppression. and he declared his conviction that he would in future be free from the attacks. He was not deceived, for from that time he seemed completely changed ; he remained in the hospital without an attack until the 20th March, when he left for home perfectly cured.

PRECIPITATED CHALK.

Many perfumers and druggists sell to the public as tooth powder natural chalk, which, on account of the large proportion of sand contained in it, is very injurious to the teeth, causing them to lose the enamel.

Precipitated chalk on the contrary can be used with great advantage, if prepared in the following way :—

1 part (calcium chloride) is dissolved in 15 parts distilled water, filtered, adding to it a filtered solution of crystallised soda in distilled water. This remains until no precipitate appears.

The fine white precipitate which is produced is precipitated chalk. The precipitate is then allowed to settle at the bottom and the fluid which is above it is carefully poured off, and some precipitate moistened with less distilled water added by means of a funnel. In the meantime the precipitate is cleansed by the syringe six and eight times, and afterwards dried by intense heat. Chalk thus prepared is absolutely free from sandy particles.

A very good tooth powder can be made with 250 grammes precipitated chalk, 125 grammes Ireos Violet root, powdered fine, 4 grammes Carmin, half gramme oil of Roses and 10 drops oil of Sandelwood.

DEUTSCHE MONATSSCHRIFT FUR ZAHNHEILKUNDE.

PROGRESSIVE DETERIORATION OF THE TEETH*

Dr. Brunsmann,in his speech on the above subject,said :—"I think we must all have been asked many hundreds of times by our patients 'How is it that in this generation the decay of the teeth is so much more prevalent than it was in olden times ? My father went to the grave with a good set of teeth, yet my teeth are so bad, and those of my children still worse.' And I think that we dentists, judging from experience, cannot deny that tooth decay is rapidly on the increase.

I must confess that I am sometimes quite horrified to find small children of eight years old with rows of decayed milk teeth. And this is not only the case with children of the upper classes, but also with those of the lower classes and with country-bred children, too.

I have, too, the model of the jaw of a young man 17 years old, in which jaw, amongst eleven other teeth, were three wisdom teeth which had to be stopped.

Now the principal question is this : Is the cause of this decay a deficiency in the teeth, a fault or imperfection in the mixture of organic and inorganic substances, a predisposition of the teeth themselves to decay, or is it an excess of hurtful influences, a preponderance of acid formation with its consequences? Is the defensive matter too weak, or the offensive too strong? As to the defensive, it is necessary to understand that the enamel contains 98 per cent. of inorganic, and only 2 per cent. of organic matter, while the tooth bone contains 72 per cent. of inorganic and 28 per cent. of organic matter. In which tooth substance does the carious process most quickly gain ground, which has least power to stand against chemical attack—the enamel with the greater quantity of inorganic matter or the tooth bone with the lesser supply?

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* From a Speech by Dr.Brunsmann at the Dental Union of Lower Saxony

We find that in most cases it is the tooth bone which soonest falls a prey to decay, that when the caries have once pierced the enamel the surrounding enamel may still remain while the inner tooth bone is quite softened or entirely disappears. So we may conclude that the more organic matter there is, the quicker the carious process proceeds.

Concerning the offensive, we know that the glands, which pour their secretion into the cavity of the mouth, yield chiefly an alkaline secretion, while the saliva gives a weakly acid secretion.

A large quantity of the mouth fluid with the alkaline fluid cannot hurt the teeth; it is otherwise when the fluid is not alkaline There is no doubt that in many cases a too strong acid formation takes place, which does not come from a temporary illness, but is chronic with the individual concerned. We see with such people the gums inflamed, particularly at the edges, and covered with slime, and the teeth look as if gnawed at the necks.

Here, then, we see the presence of too strong acid acting, the cause of caries, and there is no question, that if such circumstances were more endemic, we should here have found the reason of this general decay of the teeth.

But I incline to the opinion that a deficiency of the foundation substance, an imperfect mixture, and a proportionate inferiority of the lime substance forms the chief cause.

Being of this opinion, I have, in many families in which bad teeth are found, counselled the women while in suckling their children to take lime-water prepared by the chemist in proper doses, and when they do not feed the children themselves, to put, during the first year, a teaspoonful of it in each bottlefull of their milk.

A further cause for caries is in the food of the present day. Advance in culture and greater refinement in our customs have brought with them richer foods and a greater number of sweets, which exercise a pernicious influence on the teeth. You will say that if we read accounts of weddings and feasts in the olden times we shall find that not merely meat and bread but also cakes formed a large share of the banquets. Yes, but was there ever a time when gluttony was so much in vogue, bringing in its train all kinds of illnesses. Still this is not sufficient cause, for amongst our villagers, who cannot get these highly-seasoned goods, and who, with the exception of Schnapps drinking, cannot eat and drink too much, bad teeth are still prevalent.

I am far more inclined to think that the change in our manner of life, the overworking of the brain power, the nerve exciting strugglings and strivings of the present time are the greatest culprits.

The desirability of overburdening children with brain work has been questioned, but is now on all sides recognised as a factor of disease, but such is the struggle to keep up in the present intellectual race that the body must inevitably suffer.

Every year it is necessary for us to take longer holidays in bathing and other vitality restoring places that our overstrained nerves may not be our ruin.

In the case of children, all this head-works keeps them in the house, and instead of being out in the open air to take in enough oxygen for this over work, they take in less when they need more.

This cannot be otherwise than hurtful to the teeth. And now, my friends, if you come to observe your patients, do you not find that your most nervous patients have the worse teeth. Do you not observe that a lady who comes in a trembling or excited manner has a very bad set of teeth, and the patient whose eyes have a certain phlegmatic look is sure to show a tolerably good set of teeth. So we discover that physiological causes step in, and that loss in the nervous tone is to be recognised as a great factor. Nervousness may be struggled with by means of bromide of potassium with good effect, lime nourishment helping thereto.

I conclude, therefore, that the deficiency of lime and consequent deterioration of the teeth is to be put down chiefly to the activity of the nervous system. The nerves and brain are active to a degree which is ruinous to the teeth and other members of the body. After this the food of the present day may take its place for evil done.

So a number of causes arise in which the emotional spirit takes precedence. A young patient of 18 years, well known to me, had a very fine set of teeth. She had an unhappy love affair—after getting engaged was deceived by the gentleman. She fretted, became pale, took to fainting. In the next two years I stopped a dozen teeth for her, and soon after the once healthy blooming girl was a corpse.

Over-strain on the one hand, depression on the other, lead to the same results

These evils we dentists ought to struggle against as a moral evil. Taking into special consideration the influence of local habitat with its differences in air, &c., manners of life, and brain activity, let some of us give time to examining people of a certain age and gathering statistics that may help to combat the ravages of the enemy. I shall not have spoken in vain if I excite in some of you a desire to turn your special care and attention towards furthering knowledge on this important subject.

DENTAL COSMOS.

REMOVABLE BRIDGE-WORK.—PORCELAIN CAP-CROWNS.

By R. Walter Starr, D.D.S., Philadelphia, Pa.

The case of Mr. W. presented difficulties of an unusual character. The molars and the left second bicuspid were seen to over-hang so much that it was very difficult to tae an accurate impression After a careful study of the case, it was decided that two separate piece of removable bridge-work should be attempted, and, as an essential preliminary step, the over-hanging sides of the molars and bicuspids were ground with engine corumdum wheels and points until those sides were made much less inclined, when plaster impressions were taken first of one half, then of the other half, of the jaw. Gold cap-crowns were closely fitted over the molars, left second bicuspid, right first bicuspid, and cuspid stump. Gold crowns were made to telescope over all the caps, which were then, by means of oxyphosphate cement, fixed firmly on the teeth. Suitable plate-teeth were selected, fitted, backed, and hard-waxed in place between tho telescoping crowns. After hardening the wax with cold water from a tooth-syringe, the pieces were carefully removed, invested and soldered. The two completed bridges were easily replaced on or removed from the supporting capped teeth. Gold collars were fitted tight on the necks of the incisor stumps and the new-style porcelain caps adjusted in the collars, and set in the oxyphosphate cement which had been packed into the collars ; thus at the same time fastening the collars on the stumps and the caps in the collars.

The bridges were secured in position by placing a small piece of gutta-percha in each of the telescoping cap-crowns, which were then warmed and carefully pressed in place,— the gutta-percha filling only the spaces between the flat tops of the caps of the natural teeth and cusped caps of the bridges.

For repair one of the bridges may be removed by applying a hot instrument or hot air to the caps to soften the gutta-percha sufficiently to permit the telescoping bridge to be taken off.

A full upper vulcanite denture replaced the old one, which, by improper occlusion, had thrown the full force of mastication on the anterior teeth of the lower jaw, and so been most injurious.

DEUTSCHE MONATSSCHRIFT FUR ZAHNHEILKUNDE.

TEETH FILLING.*

Herr Kellner began by saying that he had frequently of late seen teeth filled in such a way as to induce him to speak a few words on that subject.

He said: Every filling should fill only the cavity for which it was intended, and should never rise over that cavity, much less should it bind two teeth together, as he had lately had occasion to see done in the case of a lady from Weimar.

Every plastic filling, after hardening, must be ground and polished. The edges of the cavity, as well as the filling should be rounded and polished. Exposed tooth bone, when the cuneiform defect is filled, must be polished with Vienna chalk by means of wood or leather implements. If the opening will allow it, the interior of the cavity should be polished before the filling is put in, and also before filling every cavity must be perfectly dried, and kept dry throughout the process.

In the case of teeth deprived of their pulp, and which are to be filled antiseptically, it is good to cover the antiseptic therein with a Western cap (Dr. Witzel has prepared such a cap) which, if necessary, can be kept in place by means of cement. If, in excavating a cavity, the pulp should be hurt, a cap should be filled with iodine paste and placed on the wounded pulp, kept in place, if necessary, by means of cement. Also in deep cavities, where one is afraid of coming too near the pulp, or of laying it bare, a Western cap according to the size of the hollow, should be filled with the iodine paste, the concavity downwards covering the ground of the hollow.

If there is a mesial or distal cavity under the gum, one must be careful. After laying in the plastic filling the space between every two teeth should be freed from the filling material. It is better to separate such teeth before commencing to fill.

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* From a speech by Herr Kellner at the Union of Dentists f Rheinland and Westfalen.

Now as to the process of filling.

It is very necessary to see that the cement in fastening does not stick to the spatula, but, like Plaster of Paris, is round.

How much powder is used for the fluidity depends on each preparation, but it is better not to use as much powder, as was believed necessary in early days, for the stirring.

The finer the filling material is rubbed, the more durable it is. During the stiffening process the material must be kept free from damp, and then polished with a spatula dipped in oil. When it is completely hardened, some soft wax must be laid with a spatula over it, and allowed to remain as long as possible, or the filling pencilled with varnish, as in the case of an oil painting.

Before putting amalgam in a cavity it should be carefully washed. Chloroform is best for this purpose. If it has only been cleaned with hot water, one would find on cleaning it afterwards with chloroform what a quantity of dirt had still remained.

As the amalgam only requires as much quicksilver as is used for the amalgamation of other metals, it is necessary, to ensure the durability of the filling, that all superfluous quicksilver should be pressed out between leather.

The first portion of amalgam should be rubbed into the cavity by means of globular polishing steel or Herbst's rotatory instruments. The rest of the amalgam is stopped in as firmly as possible, and so the filling completed.

After the completion of the filling, the upper surface is smoothed with a soft tooth-brush and rubbed by means of a polishing steel that tin foil may be added lightly.

Another way is to stop the cavity firmly with copper amalgam, bore the upper part of the filling with the excavation and fill the cavity with gold amalgam. The two amalgams bind beautifully.

Amalgam as the groundwork of a gold filling may be used.

Tin foil does very well for the side surface of teeth; for the masticating surface it is too soft, and so cannot be recommended Tin foil accomplishes less than gold foil, but may be recommended as the foundation of a gold filling.

Tin and gold foil bound together make a good filling for children's teeth.

Gold is decidedly the best filling material. In laying it in care must be taken that the first piece is fixed firmly to the bottom. On this the other can be built up to completion. Every bit freshly added must be well condensed and hammered into the last.

Each gold filling must form a solid body at completion.

As before mentioned, gold filling must be polished off with its surroundings by means of Vienna chalk.

INDEPENDENT PRACTITIONER.

SANITAS.

By E. S. Talbot, M.D., D.D.S., Chicago, Ill.

He quotes Dr. Harlan, who says "Sanitas is a disinfectant . . . Its elements are capable of combining with sulphuretted hydrogen gas and other products of decomposition, and thereby destroying or removing them." The first quality manifested was its odour, which remained for a great length of time. Two applications to the root of an incisor, prevented further treatment as the patient could not endure the state of the mouth. A probe was passed into the canal, and the odour of Sanitas was stronger than sulphuretted hydrogen. Dr. Talbot then made a series of experiments.

A small quantity of $H_2 S$ (Sulphuretted Hydrogen)) was placed in a test-tube and some water added, a drop of acetate of lead was put on a strip of white paper and inserted into the tube, this immediately turned dark. A few drops of Sanitas into the test tube, which was corked and shaken. In a few minutes the other end of the white paper was moistened with acetate of lead, and dipped into the test tube. The dark colour was the same as before, showing that no chemical change occurred by adding Sanitas. There is a little $H_2 O_2$ (Peroxide of Hydrogen) in Sanitas, but it is so stable that it does not unite with the $H_2 S$, and Dr. Talbot believes sanitas only acts by virtue of the small quantity of peroxide of Hydrogen it contains, and says that that disinfectant can be far better obtained without the use of the disagreeable smelling Sanitas.

Literary Notices and Selections.

PATHOLOGY OF ALVEOLAR ABSCESS.

By W. H. Whitslar, D.D.S.

(Concluded from page 93.)

Burdon Sanderson in 1870, gave a definition of inflammation which is now most universally accepted. It is this: "Inflammation is the succession of changes which occurs in living tissue when it is injured, provided that the injury is not of such a degree as at once to destroy its structure and vitality." With this definition in view then, we will conceive a case a alveolar abscess located at or near the apex of the root of a tooth. This abscess is, as we shall see, one of the succession of changes occurring from a violent inflammatory process, taking place in the alveolo dental periosteum. During the process of the formation of this abscess we perceive three distinctive changes; 1st, in the blood-vessels and blood, 2nd, in the tissues, 3rd, in the nerves.

An injury to the part having been established, nature ever ready to repair the damage done by any cause, sends nutriment to the part and at once gives up its energy to resist the attack. It is through the blood that we find this avenue of repair. Hence what we first notice is a sudden contraction of the vessels in the vicinage, produced by a reflex action through the vaso-motor centre; then inhibition follows or perhaps a mere relaxation, and then comes an increased flow of blood to the part. There is naturally a slight exudation of blood plasma from the vessels, but osmosis of this fluid becomes greater when the vessel becomes hyperæmic. Blood-pressure is the great law governing osmosis of fluids from the blood-vessels, and when the vessels become over full, a greater amount of the liquor sanguinis transudes. With this transudation there is also a migration of the white blood corpuscles, and this is a peculiar process. We have in the flow of blood through the vessels what may be said to be two currents; that which moves faster in the middle of the stream or *axial* current, and that at the sides which, from the great resistance of its bed and walls moves slower and is called the *inert* current. Now, white corpuscles seem to remain in the inert current, and cling to the walls of the vessels (in disease). This a physical phenomenon due to the irregular form of the corpuscles themselves, and the power they have of making amœboid movements. The red corpuscles choose the axial current. When from the rush of blood the vessels become clogged, the white corpuscles are seen to pass through their walls. At first there is noticed a slight elevation upon the outer part of the vessel opposite the corpuscle, then it enlarges and becomes a hemispherical prominence corresponding to the width of the remainder of the corpuscle within the vessel. As the external part increases, that on the inside diminishes, and finally the entire corpuscle bursts through on the outer side. The peculiarity of this process is that the vessels do not lose their contour and no rupture of their coats is visible.

As a result of this process the tissues become infiltrated with the leucocytes which assume different shapes and forms. It is only in a very violent stage of the disease that the red corpuscles pass through the coats of the vessels. Besides all these changes the vessels themselves are weakened and lack tonicity.

The changes in the tissues : First we note the condition of the membranes surrounding the tooth, and the first aspect we look at should be viewed in its anatomy. Many mistake the true significance of this membrane and seem to insist that it is a periosteum reflected from the alveolus upwards upon the sides of the tooth. To review the subject, I beg leave to invite your attention to a diagramatic drawing showing the direction of the fibres of connective tissue forming the membrane from the walls of the alveolus to the cementum of the tooth. You will notice that they do not pass directly transverse but obliquely across. With inflammatory disease these fibres become swollen, and coupled with the swollen condition of the blood-vessels it is readily understood how a tooth is raised from its socket. Such a feeling may however be experienced from a hyperœsthesia of these nerves.

Tomes says that the membrane is quite cellular near the cementum. If such be the case how easily it is that plastic exudation and blood corpuscles will pass into its meshes, as shown by the diagram, represents cellular tissue inflated and completely infiltrating that tissue. Such is the case exactly just previous to the formation of pus, an essential element of an abscess. For it is by the coagulation of this plastic exudation or lymph, that a clot is formed incorporating in it the blood corpuscles and making a pocket for the retention of pus. This clot we know as inflammatory lymph. A collection of pus in such a cavity is a *true* abscess, and extension takes place by a progressive destruction of the tissues. Pus of itself is formed by successive zones of new cells degenerating, becoming separated by fluids and falling into the cavity of the abscess. This zone of tissue in which the process takes place was formerly called "pyogenic membrane," but the latest writer upon the subject calls it "pyogenic zone," which is a more correct term.

Pus, as you know, presents a considerable variety in character according to the cause that gives rise to its formation. Healthy or laudable pus contains about ninety per cent. of water. The solid constituents consist of two-thirds albumen and the remaining third fats, and some salts formed usually in blood serum. Then we have the ichorous or thin and watery, the sanious or bloody, and if diluted with mucus the muco-pus. Microscopically pus presents a clear watery fluid with numberless corpuscles, many resembling the white blood corpuscle, of which only a very few are living.

In particular we notice two forms of abscess about a tooth, and those are the acute and chronic. The acute is taken as the type. In this the pain is of a throbbing nature; the parts become œdematous with some fluctuation; the gums become very red and shiny with a still darker ring of red about the neck of the tooth. In the chronic form swelling is the prevailing symptom with some dull pain. In both cases the collection of pus, swelling of the tissues, and the surplus liquid transudation, together produce the third change as a result of abscess, and this is the effect upon the nerves. This we might say is a *pressure* effect. The sequence of it is pain, either immediate or spasmodic in remote parts.

Thus we have endeavoured to bring within the narrow limits of this paper a *few* points bearing upon the physiology of alveolar abscess, knowing full well that such a subject demands a greater amount of research and knowledge than I am able to give.—*Dental Register.*

Dental News.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary Monthly Meeting, December 7th, 1885.

C. Spence Bate, F.R.S., President, in the Chair.

The Minutes of the previous meeting having been read and confirmed,

Mr. Jas. Parkinson said he hoped the President would allow him to say a few words with reference to a matter which had just been referred to in the Minutes. He was deeply sensible of the honour which had been done him in placing his portrait in the Society's meeting room, an honour to which he did not consider that he had any special claim, and it was a great surprise to him when he received, a few months before, a note from Mr. Macartney asking him to sit for his portrait, and learned the purpose for which it was intended. He wished to take the opportunity of returning his thanks to those who had subscribed for the picture,—he could not thank them individually, for he did not know who they were,--and he thanked the Society also for having so kindly accepted it. As for the kind speeches which had been made on the occasion, he could only say that it had always given him great pleasure to meet his fellow-practitioners, and that he had striven to do his best for them and for the Society. He had certainly also lived among them for a good many years, and hoped he might remain for a few more.

Mr. R. Wentworth White signed the Obligation Book, and was formally admitted to membership by the President.

The President announced that the following gentlemen had been duly nominated as candidates for membership, and would be balloted for at a subsequent meeting:—

Messrs. Peyton Grenville Levason, L.D.S., Eng., 12, Bridge Street, Hereford;

J. Charles Storey, L.D.S.I., 9, Regent's Terrace, Anlaby Road, Hull;

Walter Harrison, L.D.S., Eng., D.M.D., Harvard, 98, Western Road, Brighton;

Morgan Hughes, L.D.S., Eng., 4, Wellesley Villas, Croydon; and

Henry John Kluht, L.D.S., Glasg., 44, Norfolk Terrace, Bayswater, W.

On the motion of the President, Messrs. Henri Weiss and Charles Truman were chosen to audit the Treasurer's accounts for the current year.

Mr. F. Weiss announced the following donations to the Library:—

Report of the Smithsonian Institute for 1883.

Quarterly Journal of Microscopical Science, November, 1885.

Proceedings of the Royal Society for June, 1885.

Calendar of the Royal College of Surgeons of England for 1885.

Diagnostik der Zahnkrankeiten von Dr. Josef Arkövy.

Notes on Anæsthetics, by Arthur S. Underwood.

Mr. S. J. Hutchinson said he had received from Mr. J. H. Mummery some photographic slides for the lantern representing some interesting specimen, in Mr. Mummery's possession. They were very well executed, and Mr. Mummery had kindly promised to photograph some of the specimens in the Museum, and also to print some platina-types from them.

He had also received from Mr. Charters White two very good photographs of the section of a reunited tooth, made through the line of fracture, which had been sent for exhibition by Mr. Dunn, of Florence, and shown at the last meeting.

From Mr. Cotterell he had received two models showing supplementary wisdom teeth in the upper jaw. He believed Mr. Cotterell had another specimen to exhibit, which perhaps he would describe himself.

Mr. Cotterell said the specimen he had to show was of interest as bearing upon a question raised at the last meeting. Mr. Hepburn then exhibited for Mr. A. Underwood an upper molar with a sequestrum attached, which had been removed from the jaw of a child who had a short time before suffered from measles, and, in a note which was read, Mr Underwood mentioned another case of the same kind and asked whether they were common. In the course of the next week, he (Mr. Cotterell) met with a similiar case at the Children's Hospital, Paddington Green. The child, aged three-and-a-half years, had suffered from measles six months before. Its mouth was, of course, in a very offensive state ; the sequestrum was removed, and when brought again the following week the mouth appeared perfectly healthy.

Dr. St. George Elliott showed several contrivances which he had found useful. The first was an Electrical Indicator, in the form of a clock face, one hand being positive and the other negative. He had used this when testing the power of various forms of battery for use with the electric mallet, and by its means he could control any number of cells, increasing or diminishing the number in circuit at pleasure. Another was a small syringe, which during his recent visit to the States he had seen used by Dr. Dodge, of New York. It was made by removing the rubber cap of the S.S. White glass dropper, and substituting a cork piston with platinum piston rod and a platinum point.

The next was a hand-piece for the engine, which was simpler in its construction than any he knew of. The attachment was freed by merely pulling back a catch, and there was no need of a cross-pin to keep the bar from rotating, as in the Hodge hand-piece.

Lastly, he showed a paper disc carrier, which he had rendered more efficient by increasing the length of the screw.

Dr. Geo. Cunningham described a plan of recording cases by means of cards which had just been adapted for use at the Edinburgh Dental Hospital. It was founded upon the "Proposed System of Dental Notation" which he had described in a pamphlet published two or three years ago, and which had been adopted by a good many practitioners for keeping records of cases treated in private practice. The Edinburgh cards had a diagram of the teeth, both upper and lower, printed in light blue ink, on which the nature of the operations performed could be graphically represented; below this were spaces for all necessary particulars respecting the patient, the treatment pursued, and its results. They were to be kept alphabetically arranged in drawers after the plan of the "card catalogues" in many public libraries. Lists of the symbols and contractions used were also printed on cards, one of which was hung near each operating chair, so as to be handy for reference. Dr. Cunningham handed round specimens of the cards filled up, and gave an outline of his system, pointing out the great value of such records both in hospital and in private practice, and said he hoped the example of the Edinburgh Hospital would soon be followed by other similar institutions.

Mr. Dennant said he thought it might be taken for granted that every practitioner would like to keep a record of his operations if he knew how to do it without any great expenditure of time and trouble. For some time past he had taken notes of all his cases according to Dr. Cunningham's system; he thoroughly appreciated its value and thanked its author most heartily for it. He used cards which were not quite as elaborate in their sub-divisions as those which Dr. Cunningham had just shown, but which answered their purpose satisfactorily. When a new patient presented himself, he (Mr. Dennant) examined his mouth and noted its condition on the diagram by putting a cross against any teeth which were absent, a horizontal line against those which had been replaced by artificial substitutes, and a tick against those which were carious. At each subsequent visit he filled in a record of work done, &c., and he kept the cards alphabetically arranged in pigeon-holes. He quite agreed with Dr. Cunningham as to the desirability of having one uniform system in general use if possible. It would be a great advantage to both patient and practitioner if, when a case changed hands, a record of work done and other important particulars could be readily furnished.

Mr. Henri Weiss showed models of two cases of hypertrophy of the gums. The first was a model of the mouth of a man who had been exhibited in Paris and elsewhere as "the calf-faced man," owing to his very remarkable appearance ; it was a case of congenital hypertrophy of the gum. The other patient was a woman who for five or six years past had been troubled with slowly increasing bony hypertrophy.

Mr. Hepburn read notes of a case of dentigerous cyst of the lower jaw sent by Mr. Charles Sims, of Birmingham, and showed a model of the tumour and the denticles removed from it.

The patient was a healthy-looking boy, aged ten, son of a chemist and dentist, one of a family of six, all of whom were healthy, and presented nothing unusual as regards their dentition. The lateral and canine teeth on the right side of the lower jaw were absent, and the father said there had never been any temporary teeth in this situation, but that for some time past a swelling had been noticed which had gradually increased in size, and which had never occasioned any pain. Models were taken, and the patient was told to come again in a fortnight. At the next visit chloroform was administered, and Mr. Sims laid open the cyst. It contained no fluid, but the forty-four small denticles now shown were removed from it.

Sir William MacCormac then read notes of a remarkable case in which one blade of a pair of bicuspid forceps was impacted in the right bronchus for seven weeks and then removed by tracheotomy.

Mr. Storer Bennett referring to Sir William MacCormack's case of impadtion of the beak of a forcep in the bronchus suggested that perhaps a magnet might have proved serviceable under the circumstances.

Sir William MacCormac replied that when he found the forceps would not grasp the fragment he sent to borrow a magnet, but could not obtain one at the moment.

The President congratulated Sir William MacCormac on his success. The case was one of great interest and importance to all members of the profession, since any one of them might meet with a similar accident. As regards this liability dental practitioners were entirely in the hands of the instrument makers, and could do no more than provide themselves with instruments made by some maker of repute. He was sure they would all sympathise with Mr. Sanders under the very distressing circumstances in which he had been placed.

He then called upon Mr. F. S. Eve, F.R.C.S., to read the paper of the evening on "Some Points in the Pathology of Cystic and Encysted Solid Tumours of the Jaws."

PROSECUTION UNDER THE DENTISTS' ACT.

Galloway v. Blake.

Proceedings at the Sheffield Town Hall, before the Mayor (Alderman J. W. Pye-Smith) and Mr. H. J. Dixon, on the 21st December, 1885.

Mr. R. E. Melsheimer (instructed by Messrs. Bowman and Crawley-Boevey) appeared for the British Dental Association.

Mr. W. E. Clegg (Messrs. Clegg & Sons) represented the defendant.

Mr. Melsheimer : In this case I appear for the prosecution, the defendant, John William Blake, being charged with an offence under the Dentists' Act, 1878. I do not know whether you have a copy of the Act before you, but there are one or two of the provisions to which I shall have to refer before stating the facts. The Statute is 41 and 42 Vict., ch. 33, and the 3rd section is one of the important ones to which I shall have to refer you, under which it is an offence if any person takes or uses the name or title of "dentist" or other words or descriptions implying that he is registered under this Act, or that he is a person specially qualified to practice dentistry, unless he is registered under this Act. The defendant is not registered under the Act. The offence that he is charged with is that of using the name or title of dentist, and in the alternative other descriptions, implying that he is specially qualified. The facts are these. He has been practising here since last year, keeping the usual sort of dentist's establishment, advertising in the local papers, issuing circulars for trading purposes, and having his name on the door-plate outside the place he practises at, and in fact doing everything you would expect a dentist in this town would do. His attention was called to the fact that he was transgressing the provisions of this Act by the Secretary of the Dental Association, who wrote to him a letter in June, which I will not read at present but the Secretary will prove it, calling attention to the fact that he was committing a breach of the Act, and he then replied through his solicitors, who relied upon the provisions of the fourth section of the Statute, and that would constitute his defence. If we go on to the next section, it says a person is not guilty "if he shows that he is not ordinarily resident in the United Kingdom and that he holds a qualification which entitles him to practise dentistry or dental surgery in a British possession or foreign country, and that he did not represent himself to be registered under this Act." Of course it is not for me to anticipate how he will show these matters, but one interesting fact took place immediately after this letter in which he stated that would be his defence, and which I mention as perhaps it may help you to come to some decision as to the *bona fides* of the defence. It is this. A few days afterwards he caused the name of his father to be substituted for his own as tenant of the house in which he practised. No doubt he would think that would give colour to the statement that he is not ordinarily resident in this country, but he has however continued to be an ordinary resident up to the present moment, and is so now, and is practising in Sheffield. However, the fact that he has caused his father's name to be substituted, I mention as one of the things which would test his *bona fides*. It would not affect the case of the prosecution, which, I apprehend, will be this : it will be for you to put an interpretation upon the words "ordinarily resident," and to decide whether, upon the facts, after I have proved them, defendant is or is not ordinarily resident in this country. I would remind you how questions of domicile are dealt with. The point really for you to decide is not what he has done in the past, but what his intention is with regard to the future. Do the acts I shall prove he has committed evidence an intention of continuing permanently or rather ordinarily resident? It is not the length of time he has been actually at work, so much as the view you take of his intentions with regard to the future. It may be a man may be for a year or more in this country through a series of accidents, or his intending to return to his own country and does not do so ; or a man might be only one single week, taking up his abode in such a way as to be ordinarily resident. Then the second remark I wish to make on that section is this—that in construing those words, I shall ask you to construe them with reference to the scope of the Act and the intentions of the Act. Of course the Act is directed against the persons who practise dentistry here without proper qualification, and I shall submit that those words in this Statute would really mean that a person who is in this country for other purposes than practising as a dentist, who is perhaps attending, it may be, a medical congress or something of the kind, is allowed to use the word dentist, if a foreign dentist and it is no offence ; but the section does not mean to entitle any such person to practise in this country, and the moment he holds himself out to obtain patients in this country, then I submit he would become liable to conviction under this Act, unless he takes the steps which the Act directs, and cause himself to be first registered as a dentist practising here. Then as to the other clauses in that section, I will not say anything about them yet because I hope nothing will arise upon them. I think it will all turn on the construction you put on those words. I will now lay the facts before you, and we shall hear what the evidence will come to.

The evidence went on to show that Mr. Blake circulated cards, bearing on them, J. W. Blake, D.D.S., Graduate of Philadelphia Dental College, U.S.A., and that he actually practised as a dentist in Sheffield, and that upon his door-plate he described himself as a dentist.

The following letters were put in :—

BRITISH DENTAL ASSOCIATION.
(Incorporated June, 1880.)
49, Leicester Square, London. W.C.,
24th June, 1885.

SIR,—I beg to call your attention to the fact that the use of the term or designation "Dentist," either alone or in conjunction with any other word or words, or the use of any description implying that he is a person specially qualified to practise dentistry, by any one whose name is not on the Dentists' Register, is illegal and punishable.

As, however, the Dentists' Act is comparatively of recent origin, and so you may be ignorant of its provisions, or you may possess some qualification which you suppose entitle you to the use of this designation, I shall be glad to hear from you on the subject before bringing your case under the notice of the Executive of the British Dental Association.

I may state that the Association has no desire to deal harshly with any inadvertent infringement of the law, but that the main object of its existence is to carry out the spirit of the Dentists Act, and that it will resolutely proceed against all who purposely infringe its provisions.

(Signed) F. CANTON, Hon. Sec.

And its reply :—

June 26th, 1885.

DEAR SIR,—Our client, Mr. J. W. Blake, has brought us your letter of the 24th inst., with instructions to reply thereto. The facts are simply these :—Mr. Blake is an American subject at present residing in this country, and is a graduate of the Philadelphia Dental College, U.S.A., and he does not represent himself in any shape or way as being qualified to practice dentistry under the Dentists Act, 1878, but claims exemption under the proviso mentioned in section 4 of the Act.

Under these circumstances he thinks that he has committed no offence, or by continuing in the way he is doing will not commit any offence under the Act mentioned by you.

Yours truly,

W. J. Clegg & Sons.

Mr. Clegg : In answering this information, which has been laid to-day by Mr. Galloway, on behalf of the British Dental Association, I have one or two points to raise before your worships, which I submit will justify your worships in saying that the defendant himself has committed no offence whatever, under the Act of Parliament under which these proceedings are taken. In the first place, I would point to section 4 sub-section 1, which provides that a person "shall not be guilty of an offence under this Act, if he shows that he is not ordinarily resident in the United Kingdom, and that he holds a qualification which entitles him to practice dentistry or dental surgery in a British possession or foreign country, and that he did not represent himself to be registered under this Act." Now, with regard to the first point, about not being ordinarily resident in this country, I say I do not think it can be sustained, and I am willing to admit that the interpretation put upon it by the learned counsel is the reasonable construction that can be put upon it ; and if Mr. Blake has resided in this country for twelve months, and taken a house, and held himself out to be practising in this particular branch of business, I should only be wasting your time in saying that this gentleman, although an American subject, is not ordinarily resident in this Kingdom. But I lay great stress on this, that he has a qualification from a foreign country which entitles him to practise dentistry in that country, and that he did not represent himself to be registered under this Act and for that purpose. I call your attention to the various documents put in by the prosecution, and first of all will take the photograph, which clearly shows what this gentleman's qualification is. You will see on the sign "J. W. Blake, D.D.S., Graduate of Philadelphia Dental College, United States, America," and then underneath, is the word "Dentist," and I submit that shows that the defendant, by putting on his sign that he is graduate of this college, clearly shows that from that college it is where he has got his qualification. Mr. Clegg than proceeded to argue that the defendant had not represented himself to be registered under the Dentists Act, and that there was no evidence to show that he had been guilty of any offence.

The bench were of opinion that the offence charged in the summons has been committed by the defendant. A penalty of £5 was inflicted and the costs.

STUDENTS' SOCIETY OF THE DENTAL HOSPITAL OF LONDON.

Annual General Meeting, held Jan. 18th, 1886.

C. Truman, Esq., President, in the chair.

The minutes of the previous meeting were read and confirmed. G. H. Badcock having signed the Obligation Book, was formally admitted to membership by the President.

Messrs. T. W. Harris and J. Maberly were unanimously elected members of the Society.

On casual communications being called for, Mr. Lloyd Williams showed, and presented to the Museum a three-fanged upper bicuspid.

The President narrated the history of a case of an abscess pointing in the centre of the palate, which was in connection with the right lateral tooth. He also showed a model of a child's mouth in which half the upper jaw had been removed, and described the means by which he remedied the defect.

Mr. England narrated a case in which two laterals had died in the mouths of two sisters, each without any known cause.

The President then called upon Mr. England to read the Council's report, in which he congratulated the Society upon its satisfactory condition, both socially and financially, and on the success attending the microscopial demonstrations, instituted this year, thanking Mr. Arthur Underwood and others for the loan of specimens. He also alluded to the award of the Society's Prizes for the last three years; spoke with regret of the resignation of Mr. Campion, and in conclusion thanked the Editors of the *British Journal of Dental Science*, *Journal of the British Dental Association*, *Dental Record*, and the *Transactions of the Odontological Society* for presenting the Society with copies of their respective journals.

The Treasurer's Report was then read by Mr. Lloyd Williams for Mr. Parkinson, showing a balance in hand of £26 3s. 11d.

The ballot for the election of officers for the ensuing year was then declared open by the President, Messrs. Vipond Crocker and Lloyd Williams being appointed Scrutineers, and the result as afterwards declared was as follows:—

President—G. W. Parkinson, Esq., M.R.C.S., L.D.S.

Vice-Presidents—S. C. Buckland, L.D.S., H. S. Parkinson, L.D.S.

Treasurer—H. Lloyd Williams, M.R.C.S., L.D.S.

Secretaries—W. J. England, L.D.S., Chas. F. Rilot.

Curator and Librarian—Jas. F. Colyer.

Council (2nd year)—Geo. O. Whittaker, T. H. G. Wrighton, A. T. Croucher, H. Williams, A. Kendrick; (1st year)—Geo. Seymour, T. S. Rendall, A. P. Cater, R. Ackland.

The President then called on Mr. Croucher for his paper on "Dental Anæsthetics," which was listened to with great interest, and at its close elicited a good discussion in which the following gentlemen took part:—The President, Messrs. Rilot, England, Whittaker, Wrighton, Kendrick, Woodhouse, Moore, Hodgkinson, and Frost.

Mr. Croucher having replied, a cordial vote of thanks was unanimously accorded to him for his excellent and exhaustive paper.

Mr. J. O. Butcher then proposed a vote of thanks to the President and officers for their efforts during the past year. This was seconded by Mr. Crocker, and carried with applause.

The President, having briefly replied, announced that the next meeting would take place on Monday, Feb. 8th, when Mr. H. Williams would read a paper on "Dental Microscopy."

The meeting then adjourned.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.*

At the December meeting a paper entitled "The Hygiene of the Mouth and Teeth" was read by Mr. W. Elliott, L.D.S., F.C.S.

The teeth for the purpose of treatment were considered to have five distinct parts, each of which was minutely described —the enamel, dentine, cementum, pulp, and pericemlutal membrane.

The process of calcification, as also the action of saliva on the teeth, both in health and disease, inflammation and its causes, remedies for the relief of pain, and deposition of tartar, were each alluded to.

The subject of caries was dwelt upon at length, and the several theories with regard to its formation noticed. The causes were arranged under the heads of predisposing and exciting, amongst the latter the use of tooth-picks, improper dentifrices, liquid and solid, and abuse of popular drugs for cleansing the teeth and mouth.

With regard to this portion of the paper the author did not object to the use of the generally accepted antiseptic agents, such as carbolic acid and benzoic acid, but he did not advise salicylic acid and thymol for constant use.

Camphor was said to cause brittleness in the teeth. Charcoal was strongly objected to, whether in course or fine powder, as also was pumice and armenian bole, for similar reasons. Carbonate of sodium and borax were considered desirable additions to tooth powders and washes, as also oil of winter-green ; but the use of alum and astringents generally were not looked upon with favour. The judicious use of a very weak solution of mercuric chloride as a wash for purifying the mouth and preserving the teeth by preventing the development of micro-organisms has been shown by Professor Milles, of Berlin, to be effectual for this purpose.

There was a good attendance of members, many of whom entered into the discussion which followed.

APPOINTMENT.

John Humphreys, L.D.S.I., Honorary Surgeon to the Birmingham Dental Hospital, has been elected Professor of Dental Anatomy and Physiology, at the Queen's College Birmingham.

CORRIGENDIUM.

Page 17 Line 14 For Acointe read Aconite.

British Journal of Dental Science.

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DENTAL ANÆSTHETICS.*

By A. T. Croucher.

(Continued from page 108.)

If the patient wears a beard, it is advisable to wet it, or even to soap it. When the supplemental bag is not used, let the patient take a few deep breaths before applying the face piece, in order to make him understand what is meant by deep regular breathing, without some such similar instruction. Sometimes the breathing is shallow, rapid, and puffing. This is especially the case with nervous excitable females, who will make extraordinary exertions in the way of puffing and blowing, commencing soon after the inhalation commences. In such cases the air in the lungs is but slowly exchanged, the patient is longer in becoming unconscious and more exhausted afterwards, a firm request to breathe more slowly will generally avail ; others, again, will hold their breath until they nearly suffocate themselves, and then there will be a desperate struggle to remove the face piece, thereby letting in air and wasting time and gas in producing anæsthesia. In such cases it is advisable to allow them to breathe pure air through the inhaler for a few minutes, and then turn on the gas. Sometimes, a little later on in the administration, the patient will forcibly resist respiration, in such a case the breath may be held for ten or twelve seconds without causing alarm, but after that period the face piece should be withdrawn, and if that does not produce the desired effect, the thorax should be firmly pressed upon, and after a respiration or two of pure air the process may be continued.

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* Read before the Students' Society of the Dental Hospital of London, at the annual general meeting held Jan 18th, 1886.

The administrator should watch with unremitting vigilance the patient's breathing. The pulse should never be trusted to as a warning of danger, for it is an important fact, that if nitrous oxide gas is administered sufficiently to produce death, respiration ceases many seconds before the heart's action ; moreover, if resorted to immediately after the cessation of breathing, artificial respiration is successful, but if the pulse only is relied upon, the first warning of danger will, most probably, be the death of the patient, for if steps to restore life are delayed until after the pulse has ceased, they will then be too late. The following are the normal phenomena during the inhalation of nitrous oxide gas, allowing, of course, for some slight variation in the different cases:—After about some nine or ten full inspirations, the face becomes pale or bluish ; this is due not to venous congestion, but to the blood not being sufficiently oxygenated; the face then assumes a slightly darker tint, the fingers often twitch, and the conjunctiva may be touched without any responsive closure of the lids. This is due to reflex action generally being paralysed, and when that stage has been reached, there will be no danger of unconscious struggling. The last two or three inspirations are accompanied by stertor, true laryngeal stertor which must not be confused with the palatine stertor of a person addicted to snoring, this latter may continue throughout the administration. It is caused by the flapping of the velum palati, and has no particular significance. The laryngeal stertor is caused by the vibration of the arytæno-epiglottidean folds of moucus membrane, which approach each other, and the base of the epiglottis, gradually diminishing the respiratory aperture at this point, this closing together of the arytæno-epiglottidean folds, if the anæsthetic is pushed too far, will result in complete closure of the air passage. This will sometimes occur without the premonitory stertor, and it is important that it should not be confused with a blocking-up of the upper passage by the falling back of the tongue or folding back of the epiglottis. These latter may be relieved by pulling forward the tongue till the tip protrudes between the teeth, but in the former case, the tongue being already as far pulled forward as it will go, must be forcibly pulled against the teeth, and although the hyoid bone and epiglottis do not move, having already moved as far as they can, a reflex action operating through the nervous system causes the folds to recede, and allows free passage for the air. The tongue must be dragged against the teeth so forcibly, that if an anæsthetic had not been administered, pain would have been caused. The doing of this gives a stimulus to the nervous system.

Another source of danger is that even when the impediment to respiration caused by the approximation of these membranous folds causes complete obstruction, the respiratory heavings of the chest do not necessarily cease, but they become more jerky and irregular. This is a source of danger, because these movements of the chest wall may delude the administrator into the supposition that respiration is being continued ; and, again, because a strong respiratory effort, whether of inspiration or expiration, has a tendency to stop the heart's action, especially as the heart's action is slightly enfeebled at this point of the administration. It is here that the supplemental bag would be so useful a guide, as it can be seen by its emptying and refilling that breathing is correctly going on ; of course, should it stop, the gas must be discontinued, and forcible traction made on the tongue with a pair of forceps.

Unconsciousness may occur in from thirty seconds to two minutes after the commencement of the administration, if longer, most likely some air has been inhaled with the gas. There is no fixed time in which the anæsthetic condition is arrived at ; it varies with different patients. The state of the conjunctiva, or of the more sensitive cornea, is not a certain test, but stertor, when present, is a very reliable sign that anæsthesia is complete, but the most trustworthy one, is the subsultus tendinum of the fingers. In removing teeth from the lower jaw, the finger that protects the tongue from injury may press back that organ, and so close the glottis. The operator should avoid this, which it is very easy to do if a little care is taken ; of course, if it should occur, the tongue should be immediately pulled forward by the tongue forceps. It is never wise to operate on a patient when only partially anæsthetised, for although in some cases this may be done with impunity, yet doubtless some unexplained deaths under anæsthetics, may be put down to negligence in this particular. The operation should neither be begun before full anæsthesia is reached, nor should it be proceeded with after its effects have begun to disappear, for, according to Dr. Lauder Brunton, a very slight shock during incomplete anæsthesia may arrest the heart's action, even though its beat be normal and strong, and its structure perfectly sound. For this he gives the following reason :—" The heart's beat is accelerated by the vaso motor nerves, and inhibited by the vagus, the stimulus of a shock to the fifth nerve, which occurs in extracting a tooth, affecting both vagus and vaso motor centres at once, and equally when the nervous system is in working order, produces no effect on the beat, the one influence counter-balancing the other ; but when an anæsthetic is administered, the vaso motor centre is paralysed before the vagus centre, and for a short time the inhibitory nerve alone is active, and a shock to the fifth nerve at that moment would of course produce extreme depression, or even stoppage of the heart's action, but when the anæsthesia is complete, the reflex sensibility of both centres is abolished, therefore no such effect is to be apprehended; the venous condition of the blood during the administration of nitrous oxide minimises the danger." Apart from this danger to life, it is unwise to operate during incomplete anæsthesia, because it destroys the confidence of the patient in the anæsthetic, and frequently the gas has been blamed and discredited, when the entire fault lay in the excessive zeal of the operator, who was ambitious to do a great deal at one sitting, or to beat every other operator in the number of stumps or teeth extracted under one administration. This may be very creditable to the operator, but it is not very pleasant for the patient. The most dangerous condition occuring under nitrous oxide is when respiration has entirely ceased, the lungs being nearly empty, and the face immoveable as in death, the eyeballs congested and turned up, and the temperature of the body reduced. Under such conditions the tongue should be immediately drawn forward, and the thorax firmly pressed upon, and if this, after one or two efforts, is not followed by natural respiration, resort should be had at once to artificial respiration, the mouth to mouth inflation of the lungs is as effective as any, at least to commence with. It is not a very pleasant process, but in such emergencies there is no time to wait for pleasant things. In the Sylvester method of artificial respiration, which is considered to be the most effectual method of obtaining an interchange of the pulmonary gases, the arms of the patient being grasped about the elbow by the operator, are alternately raised and depressed, the patient's shoulders being well raised and his head thrown well back. On bringing down the patient's arms they should be firmly and gently pressed against the sides of the chest, so as to still further diminish the cavity of the thorax, by alternating the movement of the arms, and pressure of this kind. A regular interchange of air is produced, varying in quantity from 30 to 50 cubic inches, which is more than requisite for the purpose of resuscitation. If sufficient assistance is not at hand, simple manual pressure is the best and easiest to adopt, the air being forcibly expelled from the lungs, and then allowed to enter, in consequence of the vacuum produced in the thorax by the re-expanding of the walls by their own elasticity. In both this and the Sylvester method, the respirations should amount to at least 30 or even 40 per minute, the natural respirations are 18 per minute, but in cases of resuscitation, the object is to arterialise the blood more rapidly than in health, and as the same amount of air cannot be introduced by artificial means as is taken in by the normal effects, the number of respirations must be proportionally increased. There are one or two other methods of artificial respiration, but the above are quite sufficient for the purpose. Galvanism applied to the phrenic nerve and diaphragm, ammonia to the nostrils, slapping the chest with a wet towel may be used as auxilliaries to the efforts of those engaged in the œrating process. Of course in any case which will not yield to artificial respiration, or when any foreign body has found its way into the windpipe and cannot be got rid of by inversion, etc., laryngotomy must be performed, the skin, fascia, and crico-thyroid membrane are all that are cut. This answers all purposes where the mischief does not extend below the vocal cords, as spasm of the glottis, or foreign body stuck in the glottis. The principal thing in the operation is to keep in the middle line, keep the head steady and well back, and stop the bleeding before opening the windpipe. In cases of fainting the patient should be promptly laid flat on the back with the head if possible lower than the shoulders, this position is as a rule sufficient to restore consciousness in a few seconds ; an inclination to faint while in the operating chair may be checked by pushing the head downwards and forwards between the knees, a few drops of sal volatile in water, or what is still better, a whiff of nitrite of amyl will restore the patient at once. When fainting occurs after an anæsthetic it may often be traced to the patient having fasted for some time before the operation. Hysterical patients, especially females, will if permitted often give much trouble, and the more the operator gives way to and sympathises with them the more they are encouraged to go on with their vagaries. At a particular time during the administration of nitrous oxide gas the sense of hearing is morbidly acute, the slightest whisper being often heard and remembered by the patient even when the sense of pain is deadened. This morbid acuteness may be the cause of the excitement which sometimes attends the earlier inhalation and recovery. Struggling, noisy talking, &c., usually occur during recovery, never during deep anæsthesia, and rather commonly occur in patients addicted to alcohol,or with red face and dilated capillaries, but nitrous oxide has been administered to partially intoxicated persons without causing the least excitement, and although one should be on the alert for anything of this kind, yet it is unwise to restrain the patient before it is really necessary ; it is also better to preserve silence in the room until the administrator indicates to the operator that he is about to remove the face piece, this indication should always be given a second or so beforehand in order to prevent waste of time. Perfect silence should be observed during the recovery from anæsthesia, nor should the patient be roused too hastily; it is also a mistake to forcibly pull the gag out of the mouth, for it is in the last few seconds that all the dreams and sensations afterwards described take place.

Previous diet is not a matter of much importance in connection with nitrous oxide, although of course the stomach should not be loaded, nor should the patient be faint from undue abstention from food, also stimulants previously should be forbidden. Before breakfast would be the most suitable time for the administration, but in most cases it would not be so for the operator or patient, but from 3½ to 4 hours after a meal is a sufficient length of time. After a considerable loss of blood anæsthesia is produced very rapidly, therefore the patient should be narrowly watched. If there is aneurism or hernià, any struggling on the part of the patient must not be restrained by force; the same rule also applies to apoplecic patients—people with short thick necks, and of full-blooded habit. In these cases the head should be inclined neither too far backwards nor forwards to obviate any danger of compressing the veins of the neck and thus preventing the free return of blood from the head. In phthisical cases, where the disease is entensive, it is a peculiar fact, that anæsthesia deepens after the removal of the face piece, therefore in such cases less gas must be given, and full insensibility must not be attained. In the case of habitual drunkards, anatheromatous condition of the vessel walls may render struggling dangerous, while the very fact of alcoholism predisposes them to struggling. Heart disease is no drawback to the administration of nitrous oxide. Very fatty weak hearts, have been supposed to exercise a baneful influence, but no fatal case has been traced to this cause, and the condition not being diagnosable during life it is useless to consider it Great age or extreme youth of the patient is no drawback, Mr. Braine having administered gas to a lady 94 years of age; indeed it may be said that for all minor operations not lasting for more than two or three minutes, it is almost always better to give gas, in other words, that few if any states of health or disease contra-indicate it, but it is not advisable to give gas twice to the same patient on the same day, as the patient usually suffers much more from prostration after a second than after one administration, and it will probably be better in lengthy cases to employ nitrous oxide with ether, than to repeat nitrous oxide administration. I should advise all students at this hospital to frequent the gas room as much as possible. I am sure they will not find it time wasted, for there is more to be learned, and more practical hints to be gained there, than is possible from the simple perusal of any paper or book on the subject.

Sulphuric ether was the first agent successfully employed for producing insensibility to pain during surgical operations. It was brought to the notice of the profession in 1846, by Dr. Horace Wells, an American dentist, whose name I have mentioned before in connection with nitrous oxide, but much discomfort being experienced by the pungency of this agent, chloric ether was employed in its place ; the mode of administering it is by inhalation of the vapour, and its effects are produced in a short time depending on the quality of the ether, amount of air introduced with it, and susceptibility of the patient. It usually takes from two-and-half to three minutes to produce anæsthesia. It may be given either in connection with nitrous oxide, or independently by itself. Some administrators pass ether and gas through the same face piece, but when this is done the face piece becomes impregnated with ether, and it is very difficult, or almost impossible to get rid of it, and when gas alone is afterwards passed through it, patients complain of the smell and taste and in some cases of headache and sickness, the blame of which they of course impute to the nitrous oxide, which, as I have mentioned before, produces no appreciable after, effect. This objection is of course got rid of if a face piece is kept especially for the administration of the mixture of ether and gas. Mr. Braine advocates the following plan :—Having first administered gas in the ordinary method, quickly change the face piece for the Ormsby or Dublin inhaler. This should be done very rapidly so that the nitrous oxide, which the patient gets rid of by the first expiration, passes through the sponge, and becomes charged with ether vapour for the first inspiration which is seldom a full one, as the glottis take cognisance of the pungent character of the vapour, but in a few seconds this irritation seems to subside, respiration becomes normal, and the patient sinks to sleep without any struggling whatever. It is best in all cases to commence the administration with nitrous oxide to avoid any unpleasantness such as nausea during the preliminary stage. After about eight or nine good iuspirations of nitrous oxide, a sufficient stage of insensibility is reached to commence the administration of ether. In all operations required to be prolonged beyond the brief time of insensibility procurable by nitrous oxide gas, ether is generally employed as the anæsthetic agent. It produces amuch longer stage of insensibility than nitrous oxide, and is safer than chloroform, but not so safe as nitrous oxide. There are also several objections to its use, therefore, it is always better to avoid it in dental practice where possible. It has a very strong pungent odour and is less agreeable to inhale than either nitrous oxide or chloroform, moreover the after-effects are usually very unpleasant—nausea, vomiting, headache, dizziness, and general malaise not infrequently following its administration. During its administration a strict watch should be maintained over the patient. It should be seen that the breathing is fairly free and easy without irritation of the throat or bronchia. There is no fear of giving the ether vapour too rapidly, or of the ether vapour being too pungent so long as the patient breathes fairly easily, the skin should not become blanched, but should retain a florid or natural colour, the respiration should be very carefully watched, but the pulse need not be more regarded than with nitrous oxide. The symptoms indicating danger will be much the same as with nitrous oxide alone, though they are perhaps less apparent, and consequently require geater watchfulness as with ether there is usually less lividity; shallow and less frequent respiration should be watched for while if rapidity of respiration occurs it shows that the patient requires more air to be admitted to the inhaler. During the administration of ether the pulse becomes more frequent and is sometimes very much accelerated. The struggling common in patients addicted to alcohol is very much increased by the administration of ether, and is best obviated by the rapid administration of the anæsthetic. The arterial tension is increased so that bleeding is much more considerable at the time of the operation, but the danger of tiresome bleeding after tooth extraction is not increased although in persons with a hœmorrhagic diathesis some consider it wiser to abstain from the use of ether. The rules of diet are the same as those for nitrous oxide only, but they should be more strictly adhered to. In anæmic subjects insensibility supervenes more rapidly than in ordinary cases and should not be allowed to become too deep, therefore, extra care is required in dealing with them. It is wiser, if the patient be phthysical, bronchitic, very anæmic, subject to emphysema, or very old and infirm, to do as much as can be done with nitrous oxide alone, and if necessary, make another appointment rather than employ ether. Occasionally a patient will breathe very slowly and hold the breath apparently for a long time, but if the administrator breathes synchronously with him and does not suffer any discomfort, no alarm need be felt regarding him no matter how long the time appears.

Dyspnœa occasionally arises from thick tenacious mucus hanging about the fauces and epiglottis. This is most easily got rid of by changing the position of the head from one side to the other ; if, however, the breathing does not improve, open the mouth wide, and this producing the act of swallowing, may put matters straight, but if this does not succeed, pull the tongue well out of the mouth, and cause the patient to maka a forcible expiration, by sudden firm pressure on the thorax. If this pressure is applied sharply, quite at the end of a natural expiration, such a full inspiration follows that the mucus is forced from its position, and is either coughed up or swallowed. The extent to which the administration of ether should be carried has caused much diversity of opinion, every condition from simple allayed irritation to complete insensibility having its advocates, but the indication given by the patient during its inhalation whether favourable or unfavourable should determine it. Nausea is best combated by producing further anæsthesia, as during complete insensibility it does not occur. A mixture of ether and chloroform is advocated by some in preference to the use of ether alone, the object being to procure greater promptness than with ether alone, and incur less danger than with chloroform alone, the advantages claimed for the mixture having principal reference to the heart's action, it being claimed that the stimulating properties of ether counteract the depressant effects of chloroform.

(*To be concluded.*)

SWAGED METAL PLATES VERSUS PLASTIC WORK.*

By Prof. WM. H. DORRANCE, ANN ARBOR, MICH.

In a brief paper, entitled "The ill results produced by the use of artificial dentures upon plastic bases," read at the last session of the American Dental Association, the following assertion occurs: "* * under like conditions it is impossible to secure as perfect a fit with a plastic or a cast plate as with a swaged plate," which assertion may be considered the text of this short paper.

The starting point of an artificial denture is the impression, and though, doubtless, but little thought is usually given to the selection of the impression material, it is an important matter and might well be considered at length and by itself, but the limits of this paper forbid.

The nearer an impression approaches perfection the better it is for any purpose, and especially is this the case when one is required for the construction of a denture. It may be asked, what is a perfect impression? and it may be defined as follows: a perfect impression of the mouth, or rather that part of the mouth involved in the support of an artificial substitute, is one from which a model may be made which shall be a counterpart of that part of the mouth in shape, without the least distortion of the investing soft tissues. It may be safely said that ninety-five per cent. of the impressions used in common practice do not come up to this standard, but are really failures for the following (among other) reasons: (1)

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*A paper read before the Ohio State Dental Society, and reported from the *Transactions* of the Society.

The impression trays in ordinary use are not properly adapted to the case, and, (2) usually, one must be selected which is larger than is best, consequently (3) too much impression material is used, thereby forcing and pulling out of place the mucous membrane as it is reflected over on to the adjoining parts ; and frequently (4) the tray with the material it bears, is not only improperly introduced into the mouth, but is not properly sustained, nor with full control of the motions of the patient [an illustration here used]. A not uncommon result of the last fault in manipulation being a rocking impression.

All these faults are augmented, and the operator deceived into the belief that a good impression is obtained, simply because the yielding tissues about the borders of it usually so well exclude the air that some force is required to remove it. Now the proof of the quality of the impression is, in all cases made upon a plastic or a cast base, in the fit or adaptation of the plate ; and the proof of the statement, that probably ninety-five per cent. of all impressions used are not perfect, may be found in an impartial examination of all such dentures as they may come to notice.

It is evident there has been a common lack of appreciation of the real difficulties in the way of securing a perfect fit with the use of a plastic base, and a consequent failure to apply the remedy ; and the result is noticeable in the various means resorted to to sustain such plates in the mouth, such as deep air or suction chambers, as they are called—ridges raised upon the rest of the surface of the plate—the use of soft rubber disks, etc. These improper means not only eventually fail to accomplish the desired result, but by mechanical irritation materially add to the chief injury produced by vegetable plates, that due to non-conduction, and largely aid in producing serious permanent injury of the patient.

Here then is seen one of the faults of plastic work, viz : the uncertainty of the character of its fit or misfit until the case is quite ready for the mouth. While it is true that thousands are wearing dentures upon rubber or celluloid, without much complaint, for the mouth almost kindly adapts itself to many and various ill conditions, and fortunately has great recuperative energy, the conscientious and observant dentist must face the fact that a perfect adaptation cannot ordinarily be secured by the use of these materials and the manipulations necessary to their use.

What, then, is a perfect fit? In view of all the conditions involved in the wearing of an artificial substitute, it must be defined as follows: When a plate is so well and evenly adapted to the varying textures of the mouth that pressure upon any point will not dislodge it, and this without resorting to means of sustaining the plate other than the atmospheric pressure secured by its perfect adaptation, that plate may be called a perfect fit.

The following fact must now be noticed: The perfect model, from a perfect impression, is the counterpart of the mouth in shape, but not in varying texture. A brief consideration of the principles involved in securing the best results to the patient will develope the following points: An artificial denture should be so adjusted, that with the least possible injury to the parts involved, the plate may be worn with comfort, and used for the purpose of mastication and articulation with as little effort as possible; therefore, inasmuch as pressure means absorption, it should be evenly applied over as much surface as possible, and the use of large and deep chambers to secure increased pressure and a stronger hold upon the mouth, should be avoided. The starting point being the impression, that should be as perfect as possible, being taken with a material selected with a view to the requirements of the case and the condition of the mouth; care being taken to use only a sufficiency, and to so adjust it that while it invests all the surface involved, no parts are distorted. A careful examination of the mouth at this stage will determine what steps are necessary in the preparation of the impression and model. To secure an even bearing of the plate, all the hard, unyielding parts can be, in part, relieved from overpressure by a careful carving of the impression at such points; a like careful carving of the model will secure an increased pressure upon all softer parts involved.

The plate must not be allowed to ride upon the loose tissues covering the places of insertion of the muscles. Up to this point there may be no difference in the manipulation of the case for rubber, celluloid, or a plate swaged from metal, and could this preparation of the case be done with certainty, perhaps nothing more would be desirable in the way of securing an excellent fit ; but now appears the previously stated fault of plastic work, and the perfection of the adaption is only determined as the work is complete, and hangs altogether upon the uncertain perfection of the impression, together with the skill and judgment with which the impression and model are trimmed, with very little latitude for change.

Now, while in swaged work this preliminary preparation is desirable and best, one is not tied to an entire dependence upon it for perfection. Having secured a perfect model from as perfect an impression as possible, the work now passes through two important stages before the plate is struck up : that of moulding and the securing of the die. And without touching upon the methods which tend to secure the best results in these points, the gauntlet is here thrown down for the use of dies of a metal which shrinks in cooling, zinc being the type, and a defence is ready if needed. The dies and their counters being in readiness, let a moment's consideration be had of what has thus far been done to give form to the wish to give the case an even bearing upon the varying texture of the part upon which it is finally to be worn, and in that light to proceed with the work. The impression has been carefully carved thus ; the imprints of the rugæ have been deepened and enlarged somewhat, as has also that of the linear ridge or raphe, and any unusually hard point or surface of the mouth has been relieved by carving the corresponding place in the impression ; all this so well done that the casual observer would not perceive that it had been touched, and yet effectively done. No varnish or oil has been allowed to soil the impression, but the separation of the model has been effected by the saturation of the impression with water alone. The model has been carved with just as great regard for the effect to be produced, the intent being to secure pressure upon all the more soft and yielding places, whose location varies with each case, with this noticeable and unvarying exception, viz : about two-thirds of the space partly covered by the posterior edge of the plate on either side, between the raphe and the maxillary tuberosity. These places should invariably be carved to a line locating the posterior border of the plate, with a cut which gradually widens towards the front of the model as it deepens at the line, and which commences at a varying point a little away from the maxillary tuberosity, and gradually deepening to the middle of the space, again gradually grows less deep and ends before it reaches the hard centre of the arch (or perhaps better, the linear ridge) ; and thus on either side. All this with the view of securing pressure on those soft, yielding places, and not to cut with, or imbed the edge of the plate. So also should any portion of the model, which in the mouth is yielding be trimmed, especially where some extent of the ridge is involved.

These dies, then, are the result of this manipulation, but nothing like an air chamber has been so far attempted. The plate is now swaged and roughly trimmed to shape ; a thin plate of, say No. 20 to 22, Brown and Sharp's gauge, of tinner's solder, is now placed in the centre of the die, swaged, and trimmed so that it covers the linear ridge (raphe) from the papilla to within a short distance of the posterior border of the plate, with a width of a quarter of an inch, more or less, and with all its border thinned to a knife-edge, from the centre of its width. Or, if it is desired, this may be displaced by a thin plate of the same solder (that being of the right hardness to resist the blow without marring the plate) with the same knife-edges, but thickened on each side of the middle, and trimmed to the usual shape of an air chamber, preferably following the plate in outline.

The plate being then swaged again upon the die thus prepared, it is cleaned up and made ready to try in the mouth. Now, doubtless, it will invariably be found that, as in the case of the rubber, celluloid, or cast plate, there are places along the border of the plate that stand away, more or less, from the mouth, and the remedy of careful bending may usually be effectively applied ; the case may rest with too much pressure upon some place, which, being located, is relieved by overlaying the die at that point with a properly-shaped piece of the same solder plate, or lead plate if preferred. A burring away of the die and burnishing the plate to it may be effective in giving more pressure, or even a model may be formed from the plate and trimmed and the plate brought up upon it. Notice, however, the plate should never be placed upon the original model, but when finally fitted to the mouth, a model should be made from the plate and kept for future use in connection with the manipulation of the plate. Should, however, this work be overdone, recourse is again had to the die, and further trial made ; or should all attempts but disclose the fact that the impression was too much out of the way, the plate itself may now be slightly enlarged with a border of gutta-percha applied to its outside, and used as a tray to secure a more perfect impression, and the work gone over with a fine prospect of success. Careful effort should not cease until the entire border rests with equal bearing upon the parts covered, not riding upon the muscles, nor showing any prospect of injury by cutting, and until pressure against the plate upon any point fails to dislodge it. After being thus fitted the entire plate becomes an "air chamber," and a few hours wearing will develop all the atmospheric pressure needed to sustain it, even in otherwise unfavourable conditions, and considerable force will be needed to remove it. We are now much better prepared to manage the case with reference to the patient in taking the articulation, than is possible with plastic work, and we have on our side the advantage of having convinced tho patient at the outset of the character of the fit of the plate. With one hint as to further manipulation the matter may be left for discussion. After having fitted a swaged plate to the mouth, a model should be made from it and kept for future use, a step that will frequently save much trouble.

MICROSCOPY AS A GUIDE IN PRACTICAL DENTISTRY.*

By Professor Carl Heitzmann.

Mr. President and Gentlemen,—I am not a practical dentist. My practical work in dentistry is confined to cleaning my own teeth. I have, however, undergone a great deal of practical work at the hands of others. I am by birth a Hungarian, and, as you know, the care taken with the teeth abroad is very much less than in this country. There they neglect to attend to their teeth while they are young, and the result is, as an old physician described it, "When I was young I had splendid teeth, but nothing to bite; and now when I am old I have plenty to bite, but no teeth."

If, nevertheless, I undertake to speak about some practical points concerning dentistry, I do it for some good reasons. In my laboratory I have often alluded to practical points, which I by mere reasoning—and I suppose logical reasoning—have obtained a knowledge of, and frequently I have been asked the flattering question, "How is it possible, doctor, that you know so much about dentistry?" My modest answer was, "I don't know anything about it, but have simply given you what I have learned from observations under the microscope concerning practical work in dentistry." Upon receiving the invitation of my friend Dr. Walker to address you, I thought it might be well to talk about these matters in a public way, expecting that some of you, gentlemen, will take sufficient interest in the topic to reason it over, and perhaps it may lead some of you to further studies in the beautiful science of microscopy.

You know, gentlemen, that our modern views concerning the structure of the animal body are widely divergent from those that were held even as late as ten years ago. If I say "our," you will kindly pardon me. Perhaps I ought to say

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* A lecture delivered before the First District Dental Society of the State of New York, and reported in the *Dental Cosmos.*

my, when we consider the enormous success that my laboratory has met with during the last ten years. There are gentlemen constantly coming from all parts of this country, and I might almost say from all parts of the world, for at the present time I have in my laboratory a gentleman from Central Asia ; another who, although born in America, comes to me from China, and a third one came from the Barbadoes. I dare say most of them leave the laboratory as my warm friends, and have very materially changed the views they formerly held, and which are still held to be true in Europe, as to the construction of the body.

According to the previous views the body was composed of cells, each cell being considered to be an individual, many millions of such individual cells being put together into one mass to form the body in general ; whereas, I claim that there is no such thing as a cell in our tissues. What I maintain is, that every one of us is a continuous individual, one mass of living matter from the crown of the head down to the toes. When I was in Berlin, two years ago, I saw a bowl or vase of enormous dimensions, exhibited in the Berlin Museum. I asked some of my friends why that giant piece of ware, by no means tasteful in its shape, was placed in the museum, and they explained, to my surprise, that it was a single piece of Prussian marble. In this you have an illustration of what I believe to be the correct view as to the structure of the body,—the view that we are one continuous piece of living matter. There are, of course, veins in that marble, and different shades of colour, but it is a continuous mass, nevertheless. Imagine such a monster being built up in the shape of a mosaic of millions of small pieces, each piece representing what is called a cell, and you realize the difference between the previous and the present views. The significance of different tissues of the body is entirely based upon the principle of a division of labour, or that of utility.

If you examine a small animalcule, an amœba, with a power of 500 diameters, it will present, in all essential points, the same properties that belong to that fully-developed and most elaborate organism, the human body.

There is no question but that the material which builds up the low organisms, such as the amœba, is in every respect identical with that composing our own bodies. It is the great merit of Max Schultze to have first announced this truth, which has remained unshaken for the last twenty-five years. The living and building material was called "protoplasm" by him, and we still keep up this expression, because we should be loath to apply new Greek and Latin terms to material which, so far as its functions are concerned, remains a puzzle to us. I prefer to term it living matter in general; admitting, however, that it varies in its shape and constitution throughout the different parts of the body, and consequently in its special functions. In the amœba there is no such thing as a division of organs; the animal is merely a little lump of matter of very uniform structure, but nevertheless endowed with sensation and automatic motion; for such an organism will creep about under the microscope to escape obstacles placed in its way. It has, therefore, a certain amount of reason. The little amœba performs the same functions of nutrition and excretion that we ourselves do in general, and exhibits intelligence, only in a lesser degree. Functional action is plain enough; but the question, What makes that little organism move? we cannot answer. Could we but do this, we should also be ready to answer the questions, What are we for? Why do we exist? What are we doing in the world? And what is the purpose of our life? But thus far no answer has been given to any of these questions. All that is within our reach is the study of what we really do observe and comprehend; and all that is embraced in one expression, the morphology of the living matter.

We know that different parts of the living matter within one and the same organism are designed for different purposes and functions; one part—the connective tissue—for carrying nourishing material, blood and lymph, to form the frame of the body; another part—the muscles—serves for motions; others—the nerve-tissues—for the conduction of motor and sensitive impulses; and a fourth tissue—the epithelia—for protection and secretion. The teeth belong to what we are accustomed to call "connective tissue," which, speaking of man, forms nearly two-thirds of the whole animal body. It is a widely distributed tissue, of the least significance as regards vitality, but of enormous importance in the building up of the frame or skeleton of the body, the articular ends of the bones, which we call cartilage, and producing a cover all over the body,—that part of the skin which we call derma. This tissue also serves in the shape of teeth for the mastication of food. In fact, what we call dentine is a variety of bone-tissue, and what we know by the term cementum is really bone. The third tissue entering into the construction of the teeth, the enamel, has no kindred in any part of the body; neither do we know its origin. At all events, one thing is sure, that what we call connective-tissue in general is a living tissue. It serves for caerying nourishing material to different parts of the body, and for holding the nerves and blood-vessels. Most parts of a tooth are destitute of blood-vessels, since these and the nerves are confined to the central portion, the pulp-tissue. Nevertheless, we must admit, after the most careful microscopical and chemical investigations, that the teeth are composed of living tissues.

(*To be continued.*)

CANINE DENTAL PRACTICE.—The Editor of the *Journal of the British Dental Association* commenting upon the frequency of toothache among dogs, narrates how a well-known dentist undertook the somewhat hazardous task of drilling, and stopping with gold a cavity in a tooth belonging to a favourite bull terrier.

A TESTIMONIAL TO PROFESSOR REDWOOD.—Few men among Pharmacists are better known and more highly respected than Professor Redwood. His work in connection with the Pharmacopœia, is too recent to need recalling, and this only one among many of services rendered to his fellows. It is proposed to make some suitable acknowledgment of respect and appreciation to Professor Redwood.

British Journal of Dental Science.

LONDON, FEBRUARY 15, 1886.

THE DANGERS OF DENTISTRY.

These are not a few, but we do not purpose to extend our glance over so wide a field as might appear to be the case, were our heading to be considered in its entirety. There are, doubtless, dangers alike to patient and dentist, dangers of a physical, and dangers of a moral aspect, but of most of these we shall say nothing, confining our attention to those dangers which attend various operations about the teeth. It is probable that the majority of persons regard "having a tooth out' as a harmless, although supremely uncomfortable, incident in the day's work, but candour compels us to submit this is an instance in which "ignorance is bliss." Tooth extraction, even when performed by the most skilful, is beset with many and great dangers, dangers which it does not do for the dentist either to ignore or to make light of. That any given surgeon may have removed many hundreds of teeth without experiencing any untoward event, goes for naught. It is the inevitable exception which is sure, sooner or later, to crop up, and blow to the winds all one's armour of self-congratulation. There have been some curious and highly instructive cases reported in our pages of late, which exemplify in a striking way the truth of our statements. In Mr. Albert's case, a hæmophile bled to death as a result of a tooth extraction. Of course, no one is to blame. Dentists do not expect to have to deal with hœmophiles, and seldom make inquiries as to their patient's constitutional peculiarities, unless their attention is attracted by some pretty staring appearance of general debility, such as œdema, pallor, cyanosis, dyspnœa and so on. But, unfortunately. hæmophilia is a condition which is frequently unrecognised as a disease, even by the patient himself, and so is allowed to be passed over, or considered too trivial a matter about which to trouble a dentist. The condition is also very obscure, and its treatment must be admitted to be in every way most unsatisfactory. A fair number of cases are now on record in which troublesome, or even fatal hæmorrhage has followed tooth extraction, but we have learned but little so far about how to treat such melancholy cases. It seems pretty certain that all operative, *i.e.*, cutting measures, are to be deprecated, and that the most reliance should be placed in mechanical methods whereby pressure is brought to bear upon the bleeding point. Into the details of the various plans which aim at affecting this end we need not enter, they are all familiar to our readers, including that most excellent plug—the tooth itself. We desire only to remind our readers that there exists no means of foretelling when a case will turn out well, and when some really unforeseen emergency will arise. The modern method of enlisting the assistance of an anæsthetist's aid when tooth removal is deemed necessary,has at least this advantage, that it ensures having two skilled persons in attendance should things not go quite smoothly. But besides the possibility of having to deal with a hæmophile, there are dangers connected with the actual manipulation of tooth drawing. And this again has been illustrated in the case which Sir William MacCormack brought before the Odontological Society. The snapping of the blades of a tooth forceps is happily a rare accident, but it is one which is wholly outside our power to obviate. When we find even the best instruments flying, it brings us into unpleasant proximity with accidents which may happen to any of us at any moment. There are cases in which forceps, but more especially elevators, have by slipping and penetrating the fleshy vascular substance of the tongue, given rise to ugly wounds and dangerous hæmorrhage. This hæmorrhage when it starts from a wounded lingual artery often becomes very alarming. Christopher Heath has shown that hæmorrhage proceeding from this cause can be checked by pulling the tongue forward and hooking the fingers around the corner of the hyoid bone. Besides slipping or snapping of forceps or elevators, there are the dangers of teeth, or portions of teeth, escaping from between the beaks of the forceps and tumbling backwards into the windpipe or lodging in the glottis. Happily, nature generally helps us here, and by making our patient cough, produces expulsion of the foreign body. Viewing then some only of the very many untoward accidents liable to occur during tooth extraction, we are bound to repeat that the operation is one which should never be undertaken without first mentally counting the cost, and running over the possible contingencies, with the best treatment to be adopted in each case. We presume many practitioners habitually pursue this plan, but we fear that the rising generation is rather characterised, shall we say, *now* by a desire to extract with celerity rather than anything else. This, we maintain, is highly dangerous in tooth extraction.

To tooth extraction rather than in anything else, the dictum festina lente—be quick slowly—applies. May we not put it in even another way and parody, thus :—

> "*Extract* slowly, and all other graces
> Will follow in their proper places."

COCAINE IN DENTAL SURGERY.—Mr. H. E. Harris, L.D.S., in the *British Medical Journal*, sums up his experience thus : I have discarded all solutions as almost useless in dental surgery. In extraction, cocaine has no power to deaden the pain caused by the tearing of the periodental membrane from the alveolus and the rupture of the nerve, but will entirely remove that which accompanies the separation of the gum from the root of the tooth with the forceps, which is preliminary to the actual extraction. It is applied by introducing a small portion of the solid cocaine between the edge of the gum and the tooth with the point of a knife. After extraction I always introduce a small portion to the bottom of the alveolus, after bleeding has ceased and it has been properly syringed out. If any dressing be required it should be placed upon the cocaine. This will be found to almost completely do away with the pain, sometimes very severe, which is frequently experiened for some time after an extraction.

Inflamed Pulps.—Cocaine applied in the solid form will deaden the surface of an exposed pulp, and when it is inflamed will cause speedy resolution. Invariably in those cases where I used to use morphine in a dressing I use the solid hydrochlorate of cocaine instead, with the most satisfactory results.

THE DANGERS OF SMALL DENTURES.—Each year brings with it several melancholy accidents from persons swallowing dentures. The following case, which is taken by the *Dental Association Journal* from the *Times*, is only one among many which never appear before the profession. A Miss Turnerelly, who was advanced in years, had been obliged for some time to wear three artificial teeth. Early one morning, about a week ago, by some strange mischance, she swallowed them during her sleep, for when the servant, surprised at not finding her mistress astir at her usual hour, went to call her about 9 o'clock, she was horrified to find Miss Turnerelly struggling and choking in bed. This must have gone on for some hours, as was subsequently proved by the terribly lacerated condition of the interior of Miss Turnerelly's throat. Medical assistance was at once called in. With great difficulty, the teeth on the plate were caught and removed. The lady after lingering for a week succumbed to her injuries.

DANGER OF COCAINE.—An American medical journal, says *Chemist and Druggist*, mentions the case of a Chicago physician who is now in an asylum, and whose madness is traced to an inordinate employment of cocaine. In his earnest desire to investigate its wonderful properties, he became an *habitué*, and has drugged himself and his family down to the lowest depths of degradation. Taking cocaine himself, and giving it to his wife and little children, he mercilessly hacked their flesh to test its anæsthetic properties.

CEMENTS FOR RUBBER.—*Items of Interest* recommends :—(1) Powdered shellac is softened in ten times its weight of strong aqua ammonia, whereby a transparent mass is obtained, which becomes fluid, after keeping some little time, without the use of hot water. In three or four weeks the mixture is perfectly liquid ; and when applied, it will be found to soften the rubber. As soon as the ammonia evaporates, the rubber hardens again (it is said quite firmly), and thus becomes impervious both to gas and liquids. For cementing sheet-rubber, or rubber material in any shape, to metal, glass, and other smooth surfaces, the cement is highly recommended. (2). Dissolve ten parts of rubber, in small pieces, in 280 parts of chloroform, by maceration ; melt ten parts more of finely cut rubber with four parts of rosin, add one part of turpentine ; then mix the two solutions. For use, dip a piece of linen in the cement, and apply it to the torn article or rubber, which should also receive a layer of the cement before and after the application of the linen.

Abstracts of British & Foreign Journals.

THE ARCHIVES OF DENTISTRY.

SOME METHODS OF PRACTICE.*

By Geo. A. Maxfield, D.D.S., Holyoke, Mass.

To be successful, we must teach and practice the doctrine of election, especially as to the materials and remedies we must use in treating and filling teeth. Now we have reached that point where we claim each method of filling is of equal value in its place, and we say of *one* that uses either exclusively, that he is not a competent dentist.

The names of various amalgam alloys are misleading. They should not be used or recommended unless their constitution is well known.

Undoubtedly, if the manufacturers were obliged to publish the formulas of their alloys, on each separate package sold' many of them would never be used. Without doubt, one great cause of failure of amalgam fillings, comes from the use of improper alloys.

By compounding his own alloys, Dr. Maxfield gets the best results.

For the past four years he has used Dr. Flagg's formulas and has had such success with them that he could not ask for anything better. He makes his alloys from two different formulas, the first is, Silver, sixty ; Tin, thirty-five and Copper, five parts ; the second, Silver, fifty-eight ; Tin, thirty-seven and Gold, five parts.

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* Read before the Connecticut Valley Dental Society, Nov. 6, 1885.

The melting of the different metals to form these alloys is a very simple operation, and can be done in a common fire. First the Tin is placed in the crucible and kept covered with pulverized charcoal ; as soon as melted the Silver is added thoroughly stirring the mass with an iron rod until the silver is melted, when the copper is added, then the gold, constantly stirring that the different metals may be thoroughly incorporated ; as soon as the last is melted, he pours immediately, using a shallow matrix, that it may cool as rapidly as possible.

Coin silver is generally used instead of copper, adding enough pure silver to make the right proportion of copper and silver. In making his own alloys, he was considerably troubled at first, because of the loss that occurred in melting. Dr. Ambrose Lawrence says : "I can only say there is a loss in melting and remelting all alloys of metals, varying according to the composition, and I am quite sure that less than two to five ounces loss to each one hundred ounce melt is unavoidable." While Messrs. Johnson and Lund, of Philadelphia, say : "We have been making amalgams for over twenty-five years, and always experience a loss, and know no way to prevent it."

He generally melts about five ounces at a time, and the loss has been from three to four per cent. This loss undoubtedly comes from the tin, as this metal oxidizes very rapidly when in a fluid state. Detailing his method he says : "That my alloy when made may be approximately of the proportion that I wish, I weigh out the quantities as called for by the formula, then I add more tin, a quantity equal to three per cent. of the whole amount. After my ingot is cast, I work it up into fillings, using a cross-cut file, not too fine. After passing a magnet through it, to take out all particles of steel that may have come from the file, I put it away, allowing it to stand from six months to a year before using, because amalgams made from freshly filed alloys set too quickly, therefore it works more satisfactorily after "*aging*."

For cavities having four walls he uses the first mentioned alloy; but for cavities having only three walls or for contour fillings, the second alloy. By making a mixture, taking equal quantities of the fillings, of the two alloys, another alloy is obtained, and these three alloys, he thinks, are all that are needed. After six months' aging, these alloys are moderately quick in setting.

In filling a cavity with amalgam, it never should be pressed into a cavity as though it were *putty*. It should be forced into the cavity by gentle taps, that is, place part of the filling in the cavity and gently tap it into place, then add another piece, tapping that into place, and so on until the cavity is filled. In filling approximal cavities, it is best to cut through from the grinding surface unless there is space enough between the teeth to allow me to tap the filling into place.

The "Acme Amalgam Carrier," is, he contends, a very useful instrument. He adds, that of all the materials we use for filling, the oxy-phosphate is best tolerated by the teeth; therefore he uses it under metal fillings, when possible.

He finds working up his own alloys is a great saving.

It is a question, he thinks, whether mercury can be purified to any extent by re-distillation. Dr. Flagg says: "Mercury, as sold in the ten-pound stone bottles, is perfectly adapted for making dental amalgam, and the necessity for having it double-distilled—a quality thought to be something finer than is usually sold—is merely ideal. I double-distill by pouring from my ten-pound bottle of mercury into my box-wood mercury holder."

The mercury of commerce is often adulterated, to rectify it he suggests.

Take one or two pounds of mercury and digest it for three or four hours in dilute nitric acid (say one ounce to eight ounces of water), use a glass bottle and keep it a temperature of from 130° to 140°, and shake the bottle as often as five or six times an hour.

This dilute acid has little or no effect on the mercury, but readily combines with the adulterating metals. Afterwards thoroughly wash the mercury, in order to remove all traces of the acid.

PAPER ON HYDROGEN PEROXIDE.*

By Charles Mayrs.

One of the modern improvements in the use of $H_2 O_2$ in the treatment of alveolar abscesses in the cleansing of root canals and similar local pathological processes.

Within the limited extent of our knowledge, the affinity between oxygen and hydrogen appears to be limited to two combinations, one of them water, the other $H_2 O_2$.

The compound $H_2 O$ is easily formed under our ordinary circumstances, but it has not been possible to form $H_2 O_2$ by a proper mixture of oxygen and hydrogen alone, if we do not take into consideration electrical contrivances, which are still too much of an uncertainty to be of practical value.

To produce $H_2 O_2$ for practical purposes we have to employ a process which may be within the reach of every one.

Barium is one of the elements which forms two compounds with oxygen. If we take ordinary nitrate of baryta—a salt used in coloured fires to which it gives a greenish tinge—and heat it in a china-retort, the nitric radical is decomposed, and, if the process is continued sufficiently long, nothing but barium oxide remains. If we now allow a current of oxygen or of dry air to pass over this heated baryta, we obtain a second compound of barium of oxygen, called barium peroxide. This barium peroxide is the substance from which we can derive the oxygen peroxide by the substitution of barium by two equivalents of hydrogen. Any acid will answer that purpose, but to obtain a hydrogen peroxide free from baryta, a complicated course for the removal of the barium has to be employed.

A concentrated solution of hydrogen peroxide in water is obtained by a tedious process. Thénard has obtained a hydrogen peroxide which contained 470 volumes of oxygen, had a specific gravity of 15 and on boiling decomposed with explosion. This hydrogen peroxide is not a very stable compound even in dilute solution. It will decompose slowly, giving off oxygen continually, until finally nothing but water remains. This decomposition is very rapid when the substance is heated.

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*Read before the Conn. Valley Dental Society.

In almost all cases where it is decomposed a gas escapes. This gas is *oxygen*. If we treat it with certain oxydizing acids, like chromic or manganic acids, strange to say the hydrogen peroxide and one of these acids together become decomposed and lose both their oxygen. Thus a solution of per-manganate of potash when poured into the hydrogen peroxide immediately loses its colour and a brisk effervescence of oxygen takes place.

If we add chromic acid the fluid becomes green and oxygen escapes.

If we add oxide of silver, oxygen escapes and metallic silver is precipitated.

The same process takes place when we mix blood or pus with hydrogen peroxide. The escaping gas is oxygen.

Take silico-fluoric acid ; for every per cent. of silico-fluoric acid in the commercial acid take one and one half per cent. of commercial barium peroxide ; mix in a morar and work gently with the pestle. It will be preferable to add a small piece of ice while working. In this way a solution of hydrogen peroxide mixed with barium silico-fluoride is obtained. The latter is allowed to settle and the former poured off, and is then ready for use.

THE RELATIONS OF GENERAL TO SPECIAL PRACTICE.*

By Dr. W. H. Atkinson, of New York.

The relations of general to special practice are to each other as vagueness is to definiteness.

The great hindrance to working together of the general and special practitioner lies in the assumption of knowledge not possessed by either. Were they large enough to utilize each others ability, irrespective of the school to which they belong, and broad enough to take the time and trouble to get at just the exact meaning of each other, they would then be able to combine their strength for the benefit of the patients primarily, and of each other ultimately. Codes of ethics, and agreements to stand by each other, are, the writer thinks, very bad and liable to lead to much evil. To assent that either general or special practitioner is so wedded to his idol (ideal) would be difficult to substantiate. The first points to his degrees and respectable associates, instead of proving his positions; the second points to success in practice as the test of the correctness of his positions. And thus each wraps himself in the mantle of his dignity and deems the other unworthy of his effort to convince or be himself convinced. All this grows out of the ambiguity and looseness of the study of principles and their modes of behaviour in molecular and mass presentation, constituting normal and abnormal manifestations, the discrimination of which constitute competency for diagnosis. A great mistake is in the attempt to diagnose the case as a whole and not in stages of its appearance and degrees of the departure from health.

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* Read before the Connecticut Valley Dental Society, Nov. 6, 1885.

Another is, failure to take into account differences of constitution, age, sex and other conditions, all of which enter into correct understanding of every case. Another great error is the almost universal habit of taking a part of the symptoms as the entirety of the results of disturbance of function, and of regarding some one or two promient appearances as typical of the "disease" as each ailment is persistently called by people and practitioners. Probably the greatest obstacle in the way of diagnosis has its origin and pre-existence in the classification of departure from health as "*diseases*." As if they were things with generic and specific characteristics, to be killed or extirpated like vermin.

If the conditions called diseases had permanent, distinct characteristics, recorded observations might be reliable. But in practice no cases sufficiently like the record occur to enable him to recognize them as belonging to this or that particular description. The writer holds that if lecturers were to teach wholly by clinics upon actual cases, it would soon banish all jealousies and differences, between the general and the special practitioner.

No one can be a safe specialist without the general knowledge in anatomy, physiology, pathology, and therapeutics. Neither can any one be a safe general practitioner who has lightly run over any region of the human body. In the light of this last statement, then, is it not plain that no M.D., who has not also attained the knowledge indicated by the D.D.S. can, by possibility, be entitled to decide cases belonging to dentistry? An examination of the text-books and prescribed courses of study in medical colleges will reveal the fact of the meagre attention called to the embryology, histology, nourishment, derangements and treatment of the teeth, which must lead to the conclusion that competency to understand the management of the teeth in health and departures therefrom, is by such instructions impossible. Nevertheless nearly every dental enactment for the safety of the people against incompetent dentistry has tacitly or openly acknowledged that graduation as physician, or rather as M.D., entitled the holder of such degree to practice dentistry. This he holds to be a most puerile enactment.

The journals are full of jumped at conclusions of oculists, aurists, laryngologists and general practitioners, of bad eyes, bad ears, larynxes, and general bodily ailments, arising from defective teeth. The only rationale of the matter is that not being able to satisfy themselves of the source of the ailments they saw, their easy virtue led them to make the teeth a scape-goat for their sins of ignorance.

Respect for authority can be carried too far. A case in point—a girl of some eight years had her inferior canines dislocated by a stone. She was placed under the care of an M.D., who poulticed the chin until suppuration made its way through the under jaw at the junction of the variable and permanent portions immediately at the mental symphysis. This continued for seven years. The mother was then sent to a renowned professor of surgery. The result ofthe consultation was, advice to take the child (now a young lady) to her dentist and have him extract the inferior central incisors (both being pulpless), and in three weeks after the teeth were out, to bring her to him for the operation. The dentist demurred until he has consulted Dr. Atkinson. Accordingly the patient was brought to him. Dr. Atkinson advised her to bring her daughter, her dentist and medical adviser. Upon their arrival Dr. Atkinson proceeded to open through the length of both inferior central incisors, fully into a pit in the jaw bordered by necrosed, cancellous and dense bone and connecting with the fistula under the chin. He pumped creasote and oil of cloves on cotton on a fine dressing needle, till it oozed from the fistula. Then he packed the opening with a pellet of cotton wet in creasote and oil of cloves to distend it so as to afford ready access to the necrosis for the burr with which to remove it. The dentist was to renew the tents, in the meantime to open well down to the dead bone.

After burring out the dead bone Dr. Atkinson proposes to pack the cavity with a sterilized sponge.

DENTAL REGISTER

ALVEOLAR ABSCESS AND TREATMENT OF DEAD TEETH.

By Dr. H. H. Harrison.

Much inaccuracy exists among practitioners for want of a true physical diagnosis in the pathological condition of Alveolar Abscess, and also a misinterpretation of the treatment of dead teeth.

Abscess in any part of the body is the result of inflammation. We have inflammation of the nerve of a tooth, caused by exposure to foreign substances, by thermal changes or by accident, assisted possibly by an enfeebled or depraved condition of the general system. This, produces periostial inflammation, with or without abscess; a continued inflammation produces death of the nerve. After death decomposition follows. The gases generated during decomposition require room, and so force their way out of the apical foramen of the root. As they pass through the apex opening they come in contact with and poison the living tissue, producing inflammation of the surrounding parts. Thickening of the adjacent tissue forms an abscess membrane.

If the decomposition of the animal tissue results in inflammation and abscess, then the removal of the dead nerve before abscess has been established will present its formation. Hence the nerve cavity being thoroughly filled with an incorruptible and healthful material, we shall never have abscess in a tooth thus treated at any subsequent period, at least from the cause just mentioned.

Nerve broaches, drills and excavators are better disinfectants than any medicine, and in four-fifths of the cases presented you can fill at first sitting. He advises to fill as soon as you have cleansed with the intruments, relieving patients of frequent sittings.

THE DENTAL ADVERTISER.

COCAINE IN DENTISTRY.

By J. C. Daboll, M.D.S., Buffalo.

Cocaine has, it is stated, failed in dentistry as an obtunder of sensitive dentine. It has, however, many merits. In some cases of extraction, the injection of a 4 per cent. solution of cocaine into the gums lessened the pain of extraction.

In a case of chronic abscess (of several years standing) of the left superior lateral incisor root (filled) an examination through the sinus disclosed quite an extensive pocket extending down half the length of the root. It was necessary in the treatment of this to break up the sac, and with the proper instruments remove any deposit that might have formed on the root, an operation which, if thorough, is necessarily painful. The cavity was injected full of cocaine. The patient felt drowsy. This did not pass entirely off for a half hour. The local effect was all that could be desired, the operation being entirely painless.

In pyorrhœa alveolaris its use is very happy. Wiping out the pockets and filling them with the solution, in ten or twelve minutes one may work as thoroughly without causing pain to the patient. Of the many minor operations one is called on to make, the lancing of abscesses carrying the rubber dam high up on the roots of teeth, wedging, crowding the gum with clamps, especially in labial and buccal cavities,—all these may be rendered painless by the use of cocaine. The application in these cases may be made by a camel's-hair brush—painting the parts, which are previously rendered as dry as possible and afterward maintained, so that the cocaine may not be diluted by the fluids and its strength impaired.

THE EXTRACTION OF TEETH FOR PARTURIENT WOMEN.

By Garratt Newkirk, M.D., Chicago.

Referring to a case in which it was said that a woman in labour was only delivered after the extraction of an aching tooth, he takes exception to the explanation given of the case and suggests. The parturient woman is wrought up to a high pitch of mental and nervous tension. She is usually very positive, and exacting. Whatever real or fancied good she has experienced from an act in former times, she requires again. Right or wrong, she demands it, and refusal chafes and frets her.

In the case cited, there was a woman who knew a tooth had to come. Opposition chafed her, and perhaps from mentul disturbance alone, pains were weak for hours.

It is not impossible that the shock of the operation may have acted as a nervous stimulant, and excited more vigorous contractions of the womb ; so would a shock produced by such other means as sudden applications of heat and cold, or a few smart blows on the soles of the feet and palms of the hands.

But there is no evidence whatever, in the facts stated, to support the theory held, that the tooth had anything to do with retarding that labour.

JOURNAL OF THE BRITISH DENTAL ASSOCIATION

ON SECTION-MAKING OF HARD TISSUES, ESPECIALLY OF THE TEETH.*

By T. Charters White, M.R.C.S. and L.D.S., Eng.

The text books, in treating of this subject, advise first that "thin slices should be cut from the tooth with a saw."

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* Read at the Annual General Meeting at Cambridge, 1885.

Now, however desirable it may be to cut a tooth into as many sections as possible, the ordinary method, that of using a saw for cutting the sections blunts and breaks the saw and gives very imperfect results.

A lapidary's wheel has also been recommended. This would cut but few sections out of many teeth, the number of sections depending upon the thickness of the wheel used, and furthermore very few possess lapidary wheels. With care, two or three sections may be cut from a tooth by first cutting through the enamel by wetting a new thin gold file with turpentine and soft soap, and then using a broad frame saw for cutting through the dentine. There is no difficulty after the enamel is passed. This may oftentimes be grooved by a thin corundum wheel on the lathe, and the section cut by the saw afterwards.

Mr. White's plan is to take a tooth and hold it against the side of a revolving fine corundum wheel (Ash's No. 9 fine) till one side is ground quite flat, then polish that side to the most perfect polish it is capable of receiving on a piece of wet buff leather with some putty powder on it, afterwards to take a piece of stout plate glass about two inches square, and put a little old and consequently tough Canada balsam on it, warm, and spread it a little larger than your section. Let the balsam cool down till it is "tacky," then press the polished side of the tooth into close contact with the glass. When quite cold, the grinding may proceed as in the first part of the operation, till you get the required fineness, when that side may also be polished. The hard balsam round the section supporting and protecting the edges, they will not be fractured and made jagged and untidy. In not putting the tooth on to the plate of glass till the balsam is somewhat cool, you prevent the polished surface from being covered by fine cracks, which remind you of dinner plates which a careless cook has overheated till the glaze is cracked in all directions; it also prevents the balsam from running into the tubular structure of the dentine.

Mr. White also gives another method (his own) he says: Having a slice of dental or other hard tissue of moderate thickness, place it between two plates of ground glass with water and a pinch of levigated pumice powder, and by a rotary motion of the upper glass gradually rub the section down till it is thin enough for examination with even the highest powers of the microscope. But towards the end of the process be careful to watch it, for as the glasses get closer together and the section thinner, one turn more of the upper glass will sometimes result in the total disappearance of an hour's work. To avoid this some of the older pieces of glass should be used such as have become rather polished and smooth.

Canada balsam is the best mounting medium. Canada balsam is not, strictly speaking, soluble in alcohol, but is converted by it into a white pulverulent condition. Therefore the plate having the thin section attached to it, such as described in the first method of grinding, may be placed in alcohol, and after a few hours' soaking, the thin section is easily detached without fracture, but will be found coated with this altered Canada balsam, every particle of which must be removed with a clean camel hair brush kept constantly wetted with the spirit ; unless this is done the section will look messy and muddled when it is mounted permanently. Having got it quite clean, it may, with the other which has been rubbed down between the glasses, be placed in clean absolute alcohol till you want to mount it.

There are two good methods of mounting bone and teeth in Canada balsam. One is, take the section out of the absolute alcohol and let it dry, partially protecting it from dust or other contamination : when nearly dry give it a good soaking in filtered distilled water, that the tubular structure, or any minute spaces like lacuna or canaliculi may become filled with water ; afterwards dry its surfaces by wiping them with a clean warm finger, so that all moisture is taken from them, when the section may be mounted in rather firm balsam with very little fear of the structure being swallowed up in translucency. The reason blotting paper is not used for the preliminary drying is that the fibres from it adhere to your section and disfigure its appearance. The second method is to place the section for a moment into an alcoholic solution of white shellac, and quickly withdrawing it, the alcohol evaporates leaving the porous structure completely occluded and protected from the balsam, however liquid it might be.

There is another method of making sections of the dental tissues which, though not practised on many occasions, yet demands our consideration for a short time. It is applicable when it is desired to examine recently extracted teeth. These sections can only be made after decalcifying the tooth and hardening the pulp. Picric acid in a saturated solution is often employed for this purpose, a saturated solution of common alum may be used with about half a drachm of hydrochloric acid added to each ounce of solution. It is then kept for three weeks. Subsequently the tooth is soaked for a few minutes in glycerine, and sections cut with a microtome.

SUGGESTIONS ON THE USE OF COCAINE IN DENTAL SURGERY.

By W. A. Hunt, L.R.C.P., Lond., &c.

Now in the mouth, the mucous membrane does not seem to have the same absorbing power, and it is frequently covered with a thick mucous secretion, which is an immense barrier to absorption ; moreover there is in the mouth the the difficulty of keeping the agent at the spot for the time needed to produce anæsthesia. Mr. Hunt used it hypodermically.

In some cases the patients after severe questioning declared that they absolutely felt no pain of any kind during the entire operation ; *all* the rest said the pain was all but done away with, and they were without exception most gratified.

Various samples reputed to be of hydrochlorate of cocaine permitted varying degrees of sensibility. The hypodermic syringe employed had a capacity of nine minims, and was furnished with a steel needle, which is easily kept sharp withan oiltone. The syringe should be filled with hot water, its contents then squirted into a small short test tube, at the bottom of which one grain of hydrochlorate of cocaine has been placed. After warming to dissolve the salt thoroughly, the syringe dipped and four minims taken up. The gum should be punctured first on the buccal aspect about the centre of the tooth it is proposed to extract, and the needle passed as vertically as possible, so that its point may reach nearly as far as the apex of the root. The pain of the puncture is very slight, the piston is steadily pushed as often it will not yield even with force, but by keeping up firm pressure and rotating the needle, or even withdrawing it a little, the solution will assuredly flow into the tissues. The needle should be kept in the tissue half-a-minute to prevent the possibility of any of the solution escaping by the puncture. The syringe is then again filled with the four or five minims and again injected deeply into the tissues on the linguid side of the tooth. Mr. Hunt has never injected less than a grain.

Literary Notices and Selections.

MY EXPERIENCE AS A DENTIST.

How did I become a surgeon-dentist? Well, that's the rub! I might almost say I was born one for my earliest days were spent in watching my "Pater" turn out the ivories with a cork-screw, for such was my childish idea of the "key." Forceps were rarely used, and when they were it was often my luck to pick up the crowns, minus the fangs. School-days came, then apprenticeship in the North of England to a country chemist, who was too weak-nerved and tender-hearted to indulge in tooth-extracting; when I became an assistant in a quiet north-country village, I found a few old forceps kept for the purpose of pulling nails out of packages. With these it was pastime for me to practise extracting nails, however tightly fixed, without breaking off the heads, and at which I became an adept. About this time I suggested that my employer should purchase a few new forceps and a key, hang up a card "Teeth extracted here," and allow me to do the extracting. At last, after considerable hesitation—for he was very diffident and extremely cautious—

he agreed to find the instruments on condition that he should have all the cash they brought; and for bad work all the blame must fall on me; so, with his permission, I asked the advice of an old friend, a "proper dentist," what instruments were most suitable. He advised as follows:—

One instrument only for upper incisors, canines, and bicuspids.

Two instruments (1 each for right and left) for upper molars and wisdoms.

One instrument for lower incisors and canines.

One instrument for lower bicuspids.

One instrument for lower molars.

Two instruments, 1 each for upper and lower roots and stumps.

He did not wish me to have a "key," but my remembrance of the "key's" work was decidely more satisfactory, and clearer than of the forceps; so he said, as I was "key-mad," I had better get a child's key with reversible claws. I may here state never was judgment better show, for with the foregoing stock-in-trade hundreds of teeth were successfully extracted, much to my employer's satisfaction of mind and pocket. We were in the midst of an agricultural district, to which the nearest town was distant some four miles, and our patients varied from the dainty lady to the strapping plough-boy. I must confess first ventures were rather nervous, but as time went on no tooth, however bad, was too bad for my unskilful hands to dare; and now, across the brink of over a quarter of a century, recollection of those days of practice comes fraught with keener delight than do the extractions of to-day, when with a grand dental chair and improved apparatus, two or three of each kind of instrument, and all the latest varieties in pattern and shape, I remove the useless "grinders" from aching jaws.

As some practical remarks from my own experience may be of use to those engaged in pharmacy, where in country towns a surgeon-dentist may only go once a week, or in villages where he goes not at all, and where the poor, in pain, seek first the chemist's aid, I pen these lines. I find also even in towns, many chemists do not extract teeth, and yet if they will they can. The time occupied is easily spared, and the cash for the operations is "all profit," after paying for the instruments. In the first place, to those essaying tooth-extracting "fear" must be entirely put aside, and a determination to do the best for the patient one can ; and with the instruments mentioned before, and the addition of a tooth lance and probe, a very great deal can be accomplished, and that satisfactorily to the operated upon and the operator. An old dentist of whom mention has already been made gave me this advice : "When you go to take out a top tooth put the instrument carefully on and push upwards as if you expected it to come out beyond the hair ; it never will, but you will often find that the tooth has jumped out into the instrument. With the lower teeth pressed downwards as if expecting the instrument to show itself below the chin and jaw. You will not see the instrument, but before you have got it half way down the tooth is out." Which, to my surprise, I found partially true.

It is well to get a correct knowledge of the permanent teeth, thirty-two in number (sixteen in each jaw), and their exact positions ; anatomists divide them into four classes : incisors, canine, bicuspids, and molars. They are arranged in the following manner : (1) Four incisors, the two central and most prominent teeth in front of the mouth, and two lateral incisors (one on each side of the central), which are smaller and not so wide. (2) The canines, or eye-teeth, being pointed and longer than the other teeth, one on each side. (3) The bicuspids, or small double teeth, two on each side. (4) The molars, or grinding teeth, three on each side, which are much larger and stronger than the others, the last of which is called the "wisdom" tooth, and is generally the first to decay, though the last to appear.

In the extraction of teeth it should be always borne in mind that the outside of the jaw, or alveolus, in which the fangs are situated, gives way more freely than the inside, consequently pressure of the instrument used should be inclined to the outside ; also, take care to have a supply of warm water (never cold), with which the patient can wash out the mouth. It specially pleases them, and soothes the tender gums, as well as producing free bleeding, which promotes the discharge of matter when an abscess has formed.

One of the secrets of success in extracting teeth is to let the force of the instrument be laid on the root and not on the crown. For extracting lower incisors affix the forceps on the tooth (not over the gums), push it well down, press outwards, with a slight turn of the hand from side to side, lifting upwards, and the tooth is out. The extractor stands in front of the patient. With lower canines use same measures as with lower incisors, using more force ; extractor stands facing tooth. With lower bicuspids well press the forceps down, when tooth will frequently leave its socket by pressure alone. If the expected does not happen, move firmly but gently outwards, then inwards (to loosen the fangs), repeat until tooth is seen to be moving from its socket, then lift upwards. Operator stands in front of patients for right-side teeth. For left-side teeth it is more convenient for successful results for operator to stand sideways to the right of patient. For molar and wisdom teeth in the lower jaw, let the operator carry out directions as for lower bicuspids, and place himself in similar position. After fixing the instrument on offending tooth, a little pressure on the nose of the forceps with the thumb or finger of the left hand, so as to wedge the instrument down between gum and tooth, will not only enable it to be grasped firmer, but gives more certainty of its speedy extraction. For upper incisors use gentle force outwards and inwards, gradually moving the wrist as if to bring one side of the tooth to the front, and pull downwards. For upper canines do likewise. For upper bicuspids press the instrument well on the root of the tooth, move outwards and inwards, and as tooth is seen to give, use gentle extractive force downwards. For upper molars and wisdom teeth, affix the forceps on the tooth to be extracted (do not mistake "right molar" instrument for left-side tooth, or *vice versa*), push well up to get a solid hold (three or four fangs are here), move outwards then inwards, then outwards again, well bearing outside, when tooth will be seen to follow the instrument, and may at once be brought out. For all upper teeth operator should place himself to the right side of patient.

For lower stumps it will be necessary to press instrument gently down, then lift upwards. For upper stumps press forceps on and upwards gently, and carefully twist it round.

In reference to nitrous oxide and anæsthetics (chloroform and ether for inhalation), none are now used by me. Some few years ago an operation under chloroform came so nearly having a fatal termination that I have abolished them entirely. Ether spray for freezing the gum, when applied to a decayed tooth requiring extraction, when free from pain, will, to a certain extent, numb the pain of the operation; when applied to an aching tooth the pain caused by the application of intense cold is actually worse than the pain of extraction without it.

The "key" I seldom use now (though my favourite instrument in bygone days), except in those cases of upper or lower molars where one side has all decayed away; then, if there is only a little on which to secure the claw, the principle of leverage involved will accomplish its purpose. Should any who read this intend purchasing a "key," let one be chosen with reversible claws and an ivory handle (ebony handles occasionally break when key is being used, much to the annoyance of the operator, and the terror or the patient).

Plugging decayed teeth is of much importance, as it is frequently the only means of preserving them when beginning to decay (if no toothache has been felt), although removing it with a file or cutting instrument is considered far preferable in some cases.

Tartar is a discoloured coating which will form on teeth.

It is composed of an earthy matter, and at first is of the consistence of jelly, and may be readily removed, but in time it becomes hard, and requires the skilled hand of the mechanical dentist to remove it without injury to the teeth.

The mechanical part of dentistry will be better learned by three months' tuition from a skilful mechanical dentist than from all the papers that could be written, and mechanical dentistry requires more time than a pharmacist in business can spare. Those chemists who have established themselves as mechanical dentists have invariably found that one profession must be abandoned, and it has been in all cases of which I am cognisant, and they are not a few, that the shop has been sold, and rooms selected for carrying on "dentistry" alone, thereby proving that it pays better, or is more attractive, than pharmacy, though it may increase the chemist's trade in preparations, &c., for the teeth.—*The Chemist and Druggist.*

A GROWING EVIL.

By E. P. Beadles, D.D.S.

It is a distressing fact that so many people are taking up the idea that artificial teeth are better than those furnished by nature. So many of my patients say to me, "Doctor, don't you think I had better let my teeth go, and have a new set?" And especially is this the case if the teeth are a little dark, or a little irregular, though comparatively good otherwise. Then others begin to count the cost, and finding that to have the teeth extracted and a denture inserted will cost far less than to have the natural ones treated, are immediately in favour of the former.

Now, if the dentist has a mission, it is to teach the public to preserve their natural teeth. Artificial dentures are merely intended as substitutes, when the teeth have been lost from unavoidable causes. It should be the duty of every practitioner to endeavour in every case to disabuse the public mind of this growing evil, *i.e.*, that artificial teeth are "just as good."

The desire, especially among our lady patients, for pretty teeth, is sometimes so intense that they are willing to undergo almost anything to obtain this end. Then, alas! when too late, the day of regret comes. So many have told me, "If I only had not parted with my teeth!" A woman bringing me a plate to mend, not long since, made the assertion that two natural teeth were better than a whole set of artificial ones.

I often surprise my patients by saying, that if I could avoid it, I would never make another set of artificial teeth, and at the same time asserting that if the people were to do their duty, and at the same time dentists were to do their duty, there would be little necessity of teeth of substitution. It is a sad fact that so many men withhold the advice that should be given, in order to obtain the dollar which they see just ahead of them. Now, this is nothing more nor less than criminal. Our first duty should be to our patients—our highest aim and ambition to give them the very best of our knowledge and experience, whether it swells our pocket books or not. It is no less criminal for a physician to keep a patient down in bed for several weeks longer than is necessary, in order to make a larger bill.

I make it a rule never to extract a tooth, if there is the least chance to save it, unless, of course, under exceptional circumstances. If the patient continues to insist, I refer him to another, rather than ct against my own judgment.

I shall not go into the discussion of how we shall save the teeth, etc., but let our motto be, save every tooth possible, and always endeavour to impress upon the minds of our patients the great necessity of preserving the organs of mastication, pointing out to them the evils resulting from neglect, especially wilful neglect.

As said above, so many persons deliberately allow their teeth to decay, in order to obtain a prettier set,or to avoid the cost of treating. Not one in twenty seems to realise the importance of the masticating organs, until they are lost. I have heard numbers of men say, "A tooth of mine never aches long, if I can get to a dentist." The tooth is extracted. Well, one is not missed a great deal, perhaps, and when a second one aches, the forceps are resorted too again. Now, all of us understand that if this thing is kept up, the last one will go, sooner or later, and the patient finds himself toothless. Then it is that he realizes his folly.

Now, the question is, how are people to be made to realize the importance of good teeth, and the sin, I may say, of allowing the ravages of caries to destroy them?

The only answer is, by the dentist conscientiously doing his duty, both in talking and writing about the subject.

As in everything else, we are compelled to make men think before we can get them to act. Hence it is our duty, as servants of the public, to warn them upon these points, pointing them to the experience of others, and, in every way possible teaching them their duty to themselves and to their posterity. Yes, this is indeed a growing evil, and avoid it we must, if we are, in any sort of a sense, what we should be as a profession. If the experience of others is similar to my own, in regard to this subject, it is far more serious than is generally supposed. I repeat, a very large number of our people are getting it into their heads that it is the duty of the dentist to make teeth for them, rather than preserve those which they have.

In this short article, I have merely endeavoured to call attention to the subject, and hope that it will be taken up by others. It is to be hoped that this evil is not so great as my experience goes to prove. It may be confined, more or less, to localities. Nothing gives me more pleasure than to build up and restore to pristine beauty the organs which have been broken down and destroyed by disease, and I would confine myself entirely to this kind of work, were it possible.

In closing, I again assert, as my belief, that if we do our duty, and if the people will do likewise, we shall see the day when the demand for teeth of substitution will be far less than it is at the present time.—*The Southern Dental Journal.*

Dental News.

DENTAL HOSPITAL REPORTS. NATIONAL DENTAL HOSPITAL.

MONTHLY STATEMENT OF OPERATIONS PERFORMED, From December 1st, to December 31st, 1884.

Number of patients attended		1451
Extractions	Children under 14	372
	Adults	505
	Under Nitrous Oxide	406
Gold Stoppings		103
Other Stoppings		528
Advice and Scaling		327
Irregularities of the Teeth		280
Miscellaneous		154
	TOTAL	2675

ISIDORE FRED. PRAGER, House Surgeon.

DENTAL HOSPITAL REPORTS. NATIONAL DENTAL HOSPITAL.

MONTHLY STATEMENT OF OPERATIONS PERFROMED, From January 1st, to December 31st, 1885.

Number of Patients attended		20367
Extractions	Children under 14	5669
	Adults	7800
	Under Nitrous Oxide	6329
Gold Stoppings		1014
Other Stoppings		7987
Advice and Scaling		3259
Irregularities of the Teeth		2754
Miscellaneous		2552
	TOTAL	37364

ISIDORE FRED. PRAGER, House Surgeon.

DENTAL HOSPITAL REPORTS. NATIONAL DENTAL HOSPITAL.

MONTHLY STATEMENT OF OPERATIONS PERFORMED, From January 1st, to January 31st, 1886.

Number of patients attended		1367
Extractions	Children under 14	318
	Adults	515
	Under Nitrous Oxide	458
Gold Stoppings		90
Other Stoppings		628
Advice and Scaling		318
Irregularities of the Teeth		269
Miscellaneous		151
	TOTAL	2747

ISIDORE FRED. PRAGER, House Surgeon.

DENTAL HOSPITAL OF LONDON.

THE Annual Dinner of the Past and Present Students of the Dental Hospital of London, will be held on Saturday, February 27th, at the Holborn Restaurant, under the presiding of Woodhouse Braine, Esq. Gentlemen either now or formerly connected with the Hospital or Medical School, who may through misadventure not have received special notice, and who desire to be present, are requested to communicate with the Dean at the Hospital.

Correspondence.

We do not hold ourselves responsible for the opinion of our Correspondents.

GENERAL DENTAL DEFENCE ASSOCIATION.

To the Editor of the British Journal of Dental Science.

SIR,—On behalf of many gentlemen, professionally eligible, and who had been in practice before the passing of the "Dental Act," I have recently been in correspondence with the Lord President of Her Majesty's Most Honourable Privy Council, with a view of making it apparent to his lordship that these gentlemen are debarred from exercising the business of their life, through a mere accident.

Now I pointed out to his lordship that although Section 7 of the Act is pretty conclusive, yet withal there are four other Sections, which not only totally ignore its provisions but also flatly contradict them. A dentist desirous of registration would naturally turn to that part of the Act, which informs him what sum he has to pay for such a boon. Under the heading "Fees," he finds that if he applies before Jan. 1879, the fee is £2. I enclose his lordship's reply to my last, and will conclude by asking, what is the British Dental Association going to do for these men whose cases they cannot be ignorant of?

They who perhaps have not only the power, but also the means, have obliged this small, but determined band of martyrs, to the mis-use of the Anglo-Saxon tongue, to unite together to defend their rights. They have adopted as their motto, "Sero sed Serio," Slow but sure, and have vowed never to cease their labours until Section 7 of the Dentists Act is repealed, and the time of registration be declared unlimited, as obtains in both the Medical Act of 1858, and the Pharmacy Acts of 1868.---I am, Sir, Yours, &c.,

THE HON. SECRETARY.

General Dental Defence Association,
Jan. 26th, 1886.

Council Office.

Sir,—I am directed to acknowledge the receipt of your letter, received at this office on the 23rd inst., with reference to the refusal of the Medical Council to register the names of certain gentlemen under the "Dentists Act, 1878;" and I am instructed by his lordship to state that no other reply can be given you on the subject, than those contained in the letters from this office of the 16th October, 1883, and the 6th December 1884.

The 7th Section of the Act provides "that a person shall not be registered under the Act as having been at the passing thereof engaged in the practice of dentistry, unless he produces or transmits to the Register before the 1st August, 1879, information of his name and address, and a declaration signed by him in the form to the schedule to this Act, or to the like effect."—I am, Sir, Your obedient servant, C. A. PEEL.

J. Abbott, Esq., 98, Queen Street, Exeter.

A NEW NERVE PREPARATION.

To the Editor of the British Journal of Dental Science.

Sir,—As I had often been annoyed by the pain Arsenic and Morphia causes while destroying pulps, and also had patients complaining of the sickness, etc., caused by the Morphia, I began to think that Morphia was not the drug that should be used with the Arsenic.

Arsenious Acid is doubtless the only reliable eschharotic for destroying pulps, and as the pain its causes is from inflammation, the drug to mix with it should be one to prevent such inflammation. Would Aconite do?

I have used the following for more than two years with most satisfactory results:—

℞ Acidi Arsenii gr. iv.
Extracti Aconiti gr. xx. ♏

In the majority of cases, it causes no pain in applying, and none whatever afterwards; sometimes, however, it will sting. On cross-questioning the patients afterwards, they have assured me that the pain gradually passed away and was entirely gone within an hour, not to return during the whole time it has been in the tooth.

As the extract dissolves very readily in water, I would state that the dryness of the cavity during the whole time of applying it, is an absolute necessity, it being otherwise next to impossible to place it properly in position.

Arsenic and powdered Aconite Root is almost useless, the root not being absorbed.

If it should be preferred to form a paste by dissolving the above for the more easy spreading on wool, a small quantity only should be dissolved at a time, as it is apt to become mouldy if kept.

I apply it by putting a sufficient quantity on a piece o damp wool, and carrying it to its place with a pair of small plugging tweezers, and seal with mastic, taking case not to cause any pressure on the pulp.

The time taken to devitalise: 48 hours.

I have had no ill effects from the Aconite.

Trusting that it may be as useful to those that try it as it has been to me, I remain, yours faithfully,

Forest Hill. CHARLES A. CLARK, L.D.S.

APPOINTMENT.

Mr. Walter Harrison, L.D.S., Eng., D.M.D., Harvard, to be Dental Surgeon to the Royal Alexandra Hospital for Children, Brighton, vice Mr. Tod, resigned.

British Journal of Dental Science.

No. 435. LONDON, MAR. 1, 1886. Vol. XXIX

VALEDICTORY ADDRESS.*

By C. Spence Bate, F.R.S.,

Gentlemen,—The time has now arrived when it is my duty to resign the position with which I have been honoured for the last twelve months. It is the highest professional distinction that any man can hope to attain, and one of which he should needs be proud, viz., to be the President of a Scientific Society, the object of which is the elucidation of practical and theoretical phenomena connected with the profession of which he is a member.

The Odontological Society has in the past done much to bring its members together in the bonds of friendship, particularly amongst those who are even students and insist on progress.

One of the greatest hardships that the followers of the dental profession have had to contend against is the want of knowledge and general appreciation of the value of the organs which they study.

A strong illustration of this is exhibited in the order issued by the Board of Admiralty to its medical officers—that no lad shall enter Her Majesty's navy who has lost more than five teeth.†

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*Delivered on quitting the Presidental Chair of the Odontological Society.

† The following is an extract from the Admiralty Regulations referring to this subject:—

"When on examination for entry five teeth are found to be absent or unsound, instead of the candidate being absolutely rejected, his case should, if he is considered in other respects a desirable candidate, be referred on Form S.—508, the number, description, and situation of the deficient or defective teeth, as well as the condition of the others, being accurately stated.

"(*b*) In the case of newly entered boys sent for survey to a Naval Hospital on account of defective teeth, the surveying officers shall pass or reject the candidates using their own discretion as to the disqualifying nature of the disability."

The age at which a lad enters the service is about fourteen years ; at this time he has all his teeth in a forward condition, excepting the four last molars. Assuming that his teeth are sound he has a practical set of twenty-eight teeth in a forward state of development.

The condition of a lad's mouth at this age is that, although the teeth may be sound, the jaws in a large proportion are contracted, the teeth are frequently crowded and compressed, the larger and finer the teeth the more intense may be the irregularity, so that the loss of two teeth in each ramus of the jaws may frequently be found desirable to allow room for those that remain to be able to stand in the line of an even arch.

It is not infrequent that we find the four first molar teeth hopelessly riddled with decay at a very early age, and if they should be removed before the second molars have protruded themselves through the gums, the position they once occupied can in the adult mouth only be determined by experienced observation. Should the teeth anterior to these be irregular, the two first bicuspids might be removed, and in exceptional cases, when the arch is narrow, the lateral incisors might also be extracted, and yet the dental arch be retained in its even regularity.

Thus occasionally six teeth, and not infrequently four, might be judiciously removed from each of the jaws, with advantage to the future healthy condition of the mouth, and the permanent utility of the teeth improved.

Thus eight or twelve teeth might be removed from the mouth, and the person gain by the loss ; while on the other hand four teeth only might be lost, and the set made weak as a masticating organ. For instance, the loss of the two first molars from the lower jaw and the two second from the upper, or the four molars from either jaw, would not exclude a lad from entering Her Majesty's navy, while he who lost two lateral incisors and four bicuspids, that is, six teeth, would be excluded. The lad who lost the four non-corresponding molars would have a feeble organ of mastication, whereas he who lost the six above mentioned would have an improved apparatus, as might also he in whose mouth there was an abnormal degree of irregularity, if under experienced knowledge, six, eight, or more teeth were judiciously extracted. The stringent rule of the Admiralty thus excludes many good lads from serving in Her Majesty's navy, whilst their places may be taken by others with less efficient dentures, although in healthy appearance they may come up to the Admiralty standard.

Experience, moreover, teaches that many youthful mouths in which regularity and promise of beauty exist, will if neglected, exhibit in a few years the signs of interstitial decay, the incipient stage of which is only apparent to trained and careful observation. This fact, so frequently demonstrated in the lives of the middle and upper classes of society, where much thought and care is taken of the teeth, must be largely aggravated in the class from which our navy is recruited.

This liability is due to the close contact of large and well-formed teeth in jaws scarcely large enough to hold them—a characteristic that is frequently only made apparent in the defective form and irregular position of the last tooth developed. I mean the *Dens sapientiæ.* In such mouths a liberal and judicious extraction of the weaker teeth, in the earlier stage, while the disease is yet of an incipient character, would remove the lateral pressure which produces the conditions that induce decay.

If, however, such a system were pursued towards a lad who was a candidate for the navy, he would be excluded from entering that service if he had lost more than five teeth, no matter how unimportant those teeth might be.

It must be remembered that I am speaking of youths who have never heard of a tooth being plugged or treated in any way except by extraction, the consequent pain of which defers the operation until the pain it causes appears relief to the suffering that is being endured.

The teeth of this class are generally neglected and allowed to overcrowd each other to a great extent, and the consequence is that the germ of future injury to the teeth is induced by the want of a judicious weeding.

Nor is decay the only trouble likely to arise from the existence of a crowded denture.

Lateral compression is the source of much distress, and often the source of obscure pains in the teeth themselves, as well as being the cause of neuralgic affections. This is more or less frequently illustrated in the irregular position of the third molar tooth. The troubles that arise from this ill-developed organ are, I believe, mostly due to the cramped position in which it is constantly found, and which, I believe, would be largely reduced by the removal of the first molar, wherever the latter is decayed, prior to the development of the second molar tooth.

There is another disease that has of late years been drawing the attention of our profession, the study of which will yet require considerable and extensive observation before we can be supposed to have arrived at a conclusive theory of its true nature and origin.

I mean that tendency for teeth under certain obscure conditions to become loose and fall out while yet in a healthy state, long before their value as masticating organs is impaired or their work done. Sometimes, whatever the disease may be, it is found to attack one or more teeth, and these not in approximate position to one another ; again it will be found to attack all the teeth in one jaw and none in the other, and sometimes all the teeth in both jaws, occasionally sparing one or two which seem to withstand the disease, but succumb at last to the general loss of osseous support rather than from the progress of the disease itself.

For several years attention has been given to this affection, and observations pursued that bear more or less immediately on it, with a desire to ameliorate the distress when it occurs.

Unfortunately the disease is brought to our knowledge when it has advanced too far to do more than to ameliorate, and the removal of the teeth affected is the immediate or not long deferred result.

Inspection of such a set will show, when the disease is defined and well pronounced, that the gums are red and swollen, the gingival processes are large, loose, and protruding above the natural margin to an extent that sometimes equals the height of the teeth which they surround. If these gingival processes be laid back the teeth will be found, according to the length of existence or virulence of the disease, to be separated from the gums to a more or less considerable degree, and along the exposed surface of the tooth granular masses of hardened calculus will be found attached to the root, with an adhesion that is astonishingly secure. Within the pockets formed by the enlarged gum growth around the loosened teeth, there is a fluid that much resembles pus in appearance, but which when placed under the microscope is seen to be of very different construction.

This fluid is found to contain a mass of fungus germs of the bacillus and micrococcus type, which frequently exist in such an active condition that they swim in the field of the microscope in wavy lines like young tadpoles. Attached to surfaces the form attains a rod-like condition that grows to a considerable ength ; these break into smaller lines and multiply accordingly, but whether, as I believe, they originate in the smaller micrococci I cannot say.

(*To be Continued*).

DENTAL MICROSCOPY.*

By Herbert Williams.

Mr. President and Gentlemen,—In bringing before your notice this evening the subject of dental microscopy, I do not intend to consider the revolution which the use of the microscope has worked in dental histology, but rather the means by which this result has been achieved, and with this end in view, I propose to discuss, as briefly as possible, some of the various methods of preparing the dental tissues at present in vogue.

The subject is not only of great scientific interest to us personally, but has also proved of importance to the Zoologist, who has made the microscopical appearance of the teeth one of the principal means of assigning to the various animals, and more especially to those belonging to the prehistoric period, their proper position in the series they belong to.

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* A paper read before the Students Society of the Dental Hospital of London.

The pioneer of dental microscopy seems to have been a Dutch philosopher of the 17th century, one Anton von Leeuvonhoek, who, with the aid of magnifying glasses, proved the existence of the dentinal tubes; but it is principally thanks to the exertions of men like Retziu, Owen, Nasmyth, Tomes and a host of others, that our present knowledge is due.

The time at my disposal being limited, I will, without any further preamble, now pass on to the consideration of the manner of treatment demanded by (1) Hard Sections (2) Softened Sections, (3) Sections of the Pulp, and (4) Sections of Tooth germs.

CLASS I.

Having chosen your tooth, and the fresher the better, you will find the best instrument to get through your enamel is the thin edge of an ordinary gold file; once through this the fret-saw will have very little difficulty in overcoming the remainder.

Having by this means obtained four or five sections about $\frac{1}{8}$ of an inch in thickness, you next flatten one side by holding it against the corundum wheel of an ordinary lathe until it is ground quite smooth, when the scratches must be removed by rubbing on an Arkansas stone moistened with water, the section being kept in contact with the stone by the thumb or finger, or by means of a dense cork ground flat on the lathe, the use of which will prevent your wounding the skin of the finger; the section should then be finally polished on a razor strop besmeared with whitening moistened with water, then wash your specimen and dry by immersing for half a minute in alcohol. Now take an old slide or any small piece of fairly strong glass, and place one or two pieces of *dry* balsam on it. Heat these over the flame of a spirit lamp till the balsam is melted, when it must be at once withdrawn, and as soon as it reaches the condition know as "tacky" your section may be placed on the slide, the polished side downwards, pressed forcibly home and in two or three minutes the balsam will be quite hard. This mounting in balsam protects the edges of your specimen and so prevents them getting the ragged appearance so often seen. Care also must be taken to have your balsam of the right consistency, as if too warm, the surface of the tooth will be cracked in various directions, and if too liquid the balsam will permeate the dentinal tubes and lacunac of the cementum, and so render them invisible. The reverse of the tooth must now be ground and polished in the same way.

When finished, it should be left in alcohol for three or four hours, at the end of which time the specimen must be floated off the glass, and should be carefully cleansed by means of a camel-hair brush under alcohol.

Another method I have often employed and found most useful. After first reducing both sides of the specimen on a fine corundum wheel until it is fairly thin, you place it between two small sheets of plate glass, and having added some finely levigated pumice powder moistened with water, you reduce your section by rubbing the two plates together ; this is continued until your specimen is of the requisite tenuity. Great care must be exercised towards the end of the process, or you will find your section disappear entirely, an accident that has several times happened to me. This method, though very useful, is inferior to the one I have previously mentioned, as you stand more chance of damaging the enamel and leaving your specimen with that peculiar ragged look to which I have already referred.

Having obtained your section, you may stain it by means of any one of the reagents commonly employed: the manner of so staining I propose to consider later on. After staining the object should be mounted, Canada balsam being the best medium for these hard tissues, but great care is requisite in its use.

The object must be immersed in alcohol and carefully washed with a camel-hair brush ; this removes any dust, and at the same time drives out any moisture remaining, a most important point. as it will cause the preparation to cloud if left.

Now place one or two drops of the balsam on a clean slide, and heat until all the bubbles congregate at one spot; this can be materially assisted by slightly tilting the slide, at the same time applying a gentle rotatory movement. When all the bubbles are gathered together, they may be easily removed by touching them with a cold wire, to which they will readily adhere. Let the balsam cool to see that it is of the right consistency—if not, it must be re-warmed in order to drive off the excess of chloroform. Now dry your specimen by slightly heating to evaporate the alcohol, and gently drop it on the balsam—then warm your cover glass, previously well cleaned, and applying one end to the balsam, gradually let it fall on to the specimen, press it home gently with the blunt end of a pencil, and after applying a wire-clamp (shown), leave it a week to harden. These clamps I have found most useful, as in several cases I have noticed, that in spite of all my care, one or more bubbles have been present, but at the end of three or four hours, or even sooner, they may be seen gradually working their way to the free edge, and this I attribute to the continual pressure exercised by the clamp.

At the end of a week you may carefully cut away any superfluous balsam with a pocket knife, and then again replace your clamp leaving it till the balsam is quite hard.

The slides may then be finally finished by cleansing with a rag dipped in chloroform, painting the edges thinly with marine glue, leaving a week, and then giving them a second coating of the same material.

I now propose to consider the manner of using some of the different reagents employed in staining, and will commence with logwood, as it admits of almost universal application.

The solution is best filtered just before using, and sections will be more advantageously coloured if the ordinary fluid is diluted, and the immersion consequently prolonged. If, on examination, it is found that the tissues are so deeply pigmented as to render them opaque, the excess may be removed by soaking in methylated spirit, or in a ½ per cent. solution of alum.

Carmine.—The preparation recommended by Dr. Beale is undoubtedly the best and as it can be obtained at any of the depôts for microscope appliances it is hardly worth while considering the method of its manufacture. If, however, any of the carmine on keeping is found to be deposited, it may be again dissolved by adding one or two drops of ammonia. The sections should be left in the fluid for at least twelve hours, but if it is found that they are two deeply stained they should be washed with a 1 per cent. solution of hydrochloric, or glacial acetic acid ; the acid will also be found to have a tendency to brighten the colour.

Tissues stained with carmine are best mounted in glycerine jelly.

CHLORIDE OF GOLD.—For the following remarks on staining with this reagent I am indebted to the kindness of Mr. Arther Underwood :—Place one or two drops of a 1 per cent. solution of chloride of gold in a watch glass and add just sufficient of a solution of bicarbonate of soda to render the chloride neutral, then introduce your specimen and leave in the dark, till it has assumed a pale straw colour ; the period will be found to vary from half-an-hour to two hours, and is entirely dependent on the freshness of the section ; it having been found that, the more recently extracted the tooth, the shorter will be the immersion necessary.

The section should now be washed in a dilute solution of bicarbonate of soda for a few seconds, and then introduced into a second watch glass containing a 1 per cent. solution of formic acid. This glass must be floated in hot water, and as the light must again be excluded, an ordinary anchovy dish or soap bowl will be found to answer admirably ; the temperature of the water must be maintained by means of a hot sand bath, or, by immersing in another vessel of warm water which can be kept at an equable temperature over a gas stove. At the expiration of an hour the section will be found of a crimson colour, and should be withdrawn, carefully dried, and mounted in glycerine jelly. During the process, care should be taken not to let any metallic instrument come in contact with the object, and to avoid this, the section should be manipulated by means of glass rods. Many other extremely useful stains might be mentioned, amongst which are the aniline dyes and nitrate of silver, the latter, however, should not be employed for staining dentine, but I think the three I have discussed at length , will be found to meet all ordinary requirements.

These hard sections will, if stained with chloride of gold, show fairly well the general wavy direction of the enamel fibres, but to obtain transverse sections exhibiting the fenestrated appearance presented when the axial portion is removed by acids, requires a slightly different treatment. A method I have employed with very fair success is to choose as young a tooth as possible, cut off the enamel by the process previously described and then grind one side, the inner for choice, flat on an Arkansas stone moistened with water. Then dry and mount on glass with old balsam, and very gently rub down the opposite side. Great patience must be exercised or you will probably fracture your specimen, but if it is kept very moist and not allowed to get dry, the tendency to split will be, in a great measure, overcome. When sufficiently thin, free the section by soaking in alcohol, place it on a glass slide, and then apply hydrochloric acid (1 in 15) on a camel-hair brush ; leave for four or five seconds, wash the acid away with water and examine under a microscope to see if the axial portion is removed, and if not it must again be treated with the acid. It should now be dried and, if mounted in Canada balsam, the gum should be nearly solid before the section is introduced ; but it is better mounted in glycerine jelly.

Dr. Abbott recommends that the enamel, after its section by the saw, should be carefully ground under water, and then decalcified by immersing it in a dilute solution of chromic acid for 24 hours—the solution must not be stronger than ½per cent.—then stain with carmine and mount in glycerine diluted with one half its bulk of distilled water.

(*To be concluded.*)

DENTAL ANÆSTHETICS.*

BY A. T. CROUCHER.

(*Concluded from page* 153.)

Chloroform was separated from chloric ether by Mr. Waldie, of the Apothecaries' Hall, Liverpool, and was first administered by the late Sir J. T. Simpson, in the autumn of 1847, its administration in Dental operations has now become almost an exceptional matter; there are, however, a few rare cases where it is preferable to the other anæsthetics. Sometimes patients are said to recover so rapidly from nitrous oxide, or its combination with ether, that it is hardly possible to remove one tooth or root without pain being felt, and as such patients may require the removal of a considerable number, chloroform will be indicated in those cases, if there are any such; also in cases when great muscular contraction has to be overcome, as with impacted wisdom teeth, chloroform will be generally preferred, and in cases bordering on the limits between dental and general surgery, such as the removal of epulis and similar tumours, the dissecting out of cicatrices' and other operations which must occupy some time in their performance, and where anæsthesia has to be kept up during the period, and it is necessary that the mouth should be free from mucus, chloroform, no doubt, is more indicated than, and will be more generally preferred, to the other anæsthetics. Jonathan Hutchinson reckons that chloroform is safer than ether with very old people, as there is less violent struggling; this, of course, only applies when ether is administered alone, as with the nitrous oxide combination when carefully administered, there is probably less struggling than under any method; chloroform is also preferable to ether in the case of patients suffering from bronchitis. The action of chloroform upon the heart is at first slightly stimulating, but afterwards depressant, and it is this latter influence that has led so many authorities to prefer the use of ether, in order to avoid one source of danger, namely, stoppage of the heart's action. Others again contend that few cases of death under chloroform have really been traced directly to the depressing influence of the drug on the heart, and the lowering of the arterial tension, but rather to certain defects in the manner of its administration. An essential point of safety during the inhalation of chloroform is that it should never be administered above a certain strength. This is fixed by Clover at 5 per cent., and by M. Paul Bert at 8 grammes of chloroform to 100 litres of air; the properties of the mixture forming the limit between the anæsthetic dose and the fatal dose are very exact, the fatal dose being always exactly double the anæsthetic dose. Between these two points anæsthesia is quickly reached, and may be maintained with safety for a considerable time. The temperature does not vary, neither does the pulse or respiration fail. The slightest excess beyond the fatal dose is very rapidly followed by death, but no amount of chloroform given weaker than the anæsthetic dose will produce insensibility. M. Paul Bert states, as a result of his experiments with chloroform, that "whether death supervenes quickly or slowly, the heart continues to beat after the respiratory movements have ceased," but this statement is not accepted by the English authorities on the subject. There are many modes of administration, one being about as good as the other; the Scotch school have, as a rule, administered it in the simplest manner, without apparatus, and have had more success than the English school, where apparatus has been more generally employed. A surgeon named Payrand advocates a method of administration, which consists in covering the face with a light compress, then dropping a single drop of chloroform upon it, followed after an interval of a minute or so by another; this plan is also much approved by M. Paul Bert; but after all, safety depends far more upon the experienced judgment of the administrator, than upon the mode of administration, and of course it would be most unwise, and hardly legal for a dentist to administer chloroform single-handed. There are a great number of chloroform inhalers, but that generally recognised as the most perfect is one devised by Clover, on the suggestion of Snow, in which definite proportions of the vapour and air are previously mixed together, the only objection to it is that it has rather a formidable appearance, which is apt to terrify nervous people and children, thus adding another element of danger, namely, the depression consequent of fear, but this may be avoided by commencing with the lint and drop bottle, and maintaining it afterwards by the apparatus. Should much pallor be present during the administration of chloroform, or syncope appear imminent, a few whiffs of nitrite of amyl is the quickest method of restoring the heart's action. It can be obtained in a convenient form, contained in little glass capsules rolled in cotton wool, and surrounded by silk. If one of these be dropped on the floor and stamped on, the fluid runs into the cotton wool, and on being held opposite to the patient's mouth, and the vapour being inhaled, the heart at once begins to beat forcibly. Fright on the part of the patient, previous to undergoing the operation, has been known to cause death. Dr. Snow recounts a case in which the patient died of fright because the anæsthetist made a pretence of administering chloroform—that is, he had not really begun to give it, but was allowing the patient to breathe nearly pure air. Shock conveyed to the heart by operating during insufficient anæsthesia is another danger, but the most serious danger is to administer too strong a mixture of chloroform and air. Mr. Braine has noticed that a large proportion of deaths under chloroform took place just after the administration of a fresh quantity of the anæsthetic, for which fact he accounts as follows : " When the face piece is removed for a fresh supply of chloroform, even though the patient is quite insensible, the stimulus of the fresh air causes a deeper breath to be taken, and this being followed by a more complete expiration, the following inspirations are proportionately deep ones, and on the face piece being supplied, more chloroform vapour is inhaled than at any previous breath, and not only this, but it is drawn down at once into the bases of the lungs ; to avoid this, the inhaler should never be removed, but chloroform should be poured on it while on the patient's face, or if it is removed, it must never be replaced within an inch of the face for the first two or three inspirations, thus giving the lungs time to resume their old degree of expansion. This danger of too strong a dose, is a danger peculiar to chloroform. It is as well, if possible, for dental operations, to administer the chloroform at the patient's own house rather than at the dentist's, for the patient can then after the operation rest undisturbed on the bed or couch on which it was performed, complete rest being a great essential in the after treatment of chloroform ; also, if unfortunately death should occur during its administration, the dentist would not be questioned as to the death which occurred at his house. There are other anæsthetics, such as bichloride of methylene, bromide of ethyl, ethidene dichloride, &c., but none of these are extensively employed. Ethidene dichloride was experimented with by a committee of the British Medical Association, but although it has a much more pleasant flavour than either ether or chloroform, it is even more depressing in its effects on the heart than the latter, and is now rarely used. The anæsthetist should always have ready at hand a pair of tongue forceps, not those of the pattern ordinarily sold, but similar to polypus forceps, as owing to their small size they are easily introduced into the mouth, while they are strong enough to force the jaws open, and their serrated edges hold the tongue firmly. He should also have with him a "Mason's" adjustable gag, a scalpel forceps, tracheotomy tube, probang, and a few capsules of nitrate of amyl. Owing to the frequently prejudicial, and sometimes fatal consequences to which systemic anæsthesia is liable, local anæsthesia was brought into requisition. The first method to attain this was by congelation or freezing ; this is a process that has long been in use and various methods have been employed for accomplishing it, but the other spray is considered to be the best ; the instrument by which it is applied consists of a fluid holder, a graduated 4oz. bottle, and bellows, consisting of a rubber ball, with the proper valves, and the points from which proceed the spray, all being connected by a proper sized flexible-tube. For the extraction of teeth, a double point is applicable, throwing a jet on the gum on each side of the tooth at the same time, the single point is used when incision or excision is required to be made, but the pain of the application, which takes several minutes to effect its purpose, and in some cases the partial results obtained, and also the fact that it is sometimes followed by severe sloughing of the parts operated upon, have prevented its general use. Galvanism was first applied for dental anæsthesia by Mr. Francis of Philadelphia in 1858. A current of electro-galvanism is sent through the teeth by way of the forceps, one conducting wire being attached to the forceps, while the patient holds the other. There is great diversity of opinion as to its efficiency, some state that when properly employed it will in the majority of cases mitigate pain, while others affirm that it does not produce insensibility to any appreciable extent, and therefore does not relieve pain, but that it only complicates the sensation, so that the patient can hardly decide which caused him the most pain, the electric shock, or the shock of the extraction. Where there is acute periostitis, an electric current even though feeble, would produce intense pain, and should not be employed.

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* Read before the Students' Society of the Dental Hospital of London at the annual general meeting held Jan. 18th, 1886.

Chloroform either simple or mixed with other substances is more or less used for inducing local anæsthesia. Dr. Taft, of Ohio, advocates a mixture of chloroform, tincure of aconite, belladonna, and opium. These mixtures are best applied on a dossil of cotton contained in a cup fitting over the tooth and gum.

Cocaine is the latest local anæsthetic, but I do not purpose discussing its merits to-night, as it has yet to be proved; but I may just recount two cases in which I saw it tried, in the first, when a dead root was extracted, it was perfectly successful, the patient feeling nothing of the operation, but in the second, when an upper molar that had been previously broken off under the gas was extracted, it was not so successful, the patient feeling the wrench of the extraction, although he did not feel the passage upwards of the forceps; both operations were performed on the same patient, the gum was first thoroughly dried and the solution applied on cotton wool to each side of the tooth, and left there for three minutes, being protected by a napkin from the incursion of the saliva.

MICROSCOPY AS A GUIDE IN PRACTICAL DENTISTRY.

(Concluded from page 162).

The reason why the new views have obtained a start in this country, while they are so slowly accepted in the old country, is that in the latter there is a great deal of this peculiar conservatism. I ask any intelligent person whether the old-fashioned view, that we are composed of innumerable cells, meets his idea of the construction of the animal body? This question is often raised in my laboratory, and always answered in the negative; whereas, the proposition that we are one continuous mass of living matter should, it would seem, appear reasonable to every one. Does not the whole body work together in harmony throughout? Does not that body react upon an injury done to a toe, or to the pain of an aching tooth?

Division of labour, I said, is the principle upon which the different parts of the body work. This is especially true of the different portions widest apart in their vitality and in their reactive power. If you look at the cartilage-tissue, you will see what they used to call cartilage-cells, and between them the so-called intercellular or basis-substance, which up to our time was considered to be inert. Resorting to the higher powers of the microscope, we can easily satisfy ourselves as to the presence of a delicate reticulum throughout the cartilage-corpuscles and throughout the basis-substance. This reticulum I proved to be the living matter proper. This reticulum is, therefore, the very material that builds up the body; whereas, the liquid contained in the meshes of the reticulum of the protoplasm, in the cartilage-corpuscles, and the glue contained in the meshes of the basis-substance, are inert. I admit that heretofore the structure of the tissues was not easily demonstrated. It takes a certain amount of education of the eye to see all these minutiæ. But after a little training of the eye, and by the treatment of the cartilage with absolute alcohol, which renders the connections of the cartilage-corpuscles easily visible, they can be seen by all, notwithstanding the difficulties to be overcome. I am happy to say that a couple of months ago I came into possession of a beautiful and rather expensive machine, which was made in Vienna for me, and is an invention of Professor Stricker. It is a so-called electric picture microscope. The instrument was brought by Dr. Gartner, one of Professor Stricker's assistants. I have already made a great many trials with this instrument, and the result is that all the structural minutiæ can now be demonstrated to 400 or 500 persons simultaneously without the least difficulty. I have not yet succeeded in obtaining a suitable amphitheatre where exhibitions can be given with this instrument to a large audience. Another difficulty has been that we could not procure carbons of a proper size. As soon as we receive proper carbons, and can dispose of 3,500 candle-light, the demonstrations will begin. We have obtained perfect images at short distances of about half-a-yard, and when the electricity is increased to forty amperes (the light burning in Fifth avenue is ten amperes), I shall be able to show to hundreds of people at once the details referred to. This is the aim of my life, and when it shall have been accomplished I do not wish to do much more in this department.

I may say that the laziest tissue in the human body is the cartilage. It consists of a reticulum of living matter partly free in the cartilage-corpuscles, partly buried in the basis-substance. The most active tissue, on the contrary, is the nerve-tissue. Here again is a continuous mass of living matter, starting from the brain and running as nerve-fibres throughout the whole length of the body. Between these two in point of activity stands the tissue that we call dentine. Here we see, at the outer periphery, which Dr. Atkinson has aptly termed the interzonal layer, protoplasmic bodies between the enamel and the dentine. We know that these are in connection with the pulp-tissue by means of fine threads of living matter, the so-called dentinal fibres.

Here are three tissues as samples, and if you realize that living matter is present in every one of them, the question, necessarily arises. How is it that this living matter will behave so differently in different tissues ? The answer is to my mind plain enough. The cartilage-corpuscles are surrounded by a comparatively tough and dense basis-substance. In the nerve-tissue there is no such obstacle. The living matter in the centre of the organism is directly connected with the living matter in the peripheral parts of the body through the medium of the living matter that we call nerves. In a tooth there are similar characteristics. The enamel-tissue at the periphery is directly connected by delicate threads of living matter with that in the pulp-chamber. The action of living matter, therefore, necessarily differs in its manifestations in cartilage, in nerve, and in tooth-tissue. In the former the action is confined to a very small place, perhaps to a single corpuscle. Suppose an impulse, resulting in the contraction of the living reticulum, starts in a single cartilage-corpuscle, what will be the effect? This impulse has to pass through the dense, tough basis-substance; therefore the conduction must be a very slow one. Nevertheless, do not imagine that cartilage is an absolutely inert tissue. In 1872 I burned with a hot iron the cartilage of the knee-joint of a dog. Eight days afterwards, when the animal was killed, I found, very much to my surprise, a brown discolouration in the cartilage,—not in the immediate vicinity of the place where the hot iron was applied, but one or two millimètres away, forming a brown ring around the original burn. An examination with the microscope proved that the charcoal particles which produced the discolouration were deposited in the comparatively healthy and otherwise unchanged cartilage-corpuscles. The coal particles, it is evident, were transported through the threads of living matter, traversing the basis-substance into the neighbouring cartilage-corpuscles. These proved to be cannibals, for they had eaten tbe remnants of their own brothers. If a cartilage-corpuscle be irritated, the impulse will perhaps be carried a short distance only. If such a cartilage-corpuscle could think and talk in a popular way, what would be likely to follow? It would send a message for assistance to its neighbours, telling them, "I am injured; I want you to help me." When that appeal for help comes to the neighbour through the dense basis-substance, the voice is scarcely heard, and the neighbours perhaps asks, "What did you say?"

The fellow will shout again, "Help?" The neighbour wil answer, "Let me alone; I like to sleep; if you are hurt, defend yourself." Even after such a severe injury as that produced by the application of a hot iron, no inflammatory reaction will follow in the cartilage.

Widely different is the case with the ganglionic bodies and nerve-tissue. Here everything, from the first moment of conception to the last breath, is continuous motion and change. Even while we are asleep the nerve-tissue has to do its work, for it controls the action of the heart and the movements of the muscles in respiration. If I apply a hot iron to my skin, or let a burning cigar-leaf fall upon my hand, the protoplasm in the periphery of my body telegraphs at once through the nerves to my brain that something is wrong. This message is carried like lightning to the centre of sensation first; this immediately telegraphs to the centre of motion, and the latter telegraphs back to the muscles. The result is, that I quickly remove that burning leaf, or do something to get rid of the obnoxious object. All that is reflex action, and is performed with great rapidity. If an injury is done to the body, the nervous system helps us to get rid of the offending object and puts us in the way of defence. At the same time the injured protoplasm will produce a reaction for the purpose of healing up the damage, resulting in what we call inflammation. The scar left after an injury is the result of the inflammation that nature sets up in trying to heal the wound made by the burning cinder.

Taking the third tissue, the dentine, there is something very similar in its reaction. When you bore a hole into a tooth, so long as you work in the enamel the reaction is not very great; but when you reach the interzonal layer the protoplasmic bodies immediately send a message for help. They telegraph at once to their neighbours, "We are injured, come and help us;" from there the message is carried to the centres of sensation and motion, and assistance comes immediately. The man kicks, and tries to remove the hand of the dentist. Not only in the interzonal layer, but about the neck of the tooth, is found a greater proportion of living matter than in other parts of the dentine Should inflammation set in, which means an effort of nature to heal up the damage done, it will be manifested not only in the immediate neighbourhood, but the reaction will extend further, and we get inflammation in the pulp of the tooth. Inflammation, so long as it runs within certain limits, is in many respects beneficial. It leads to the production of embryonal tissue; afterwards of newly-formed dentine, which, though not as perfect as primary dentine, serves at least as a protection against new damage. If the injury is very deep, then woe to the man; pulpitis will set in, accompanied by terrible pains, the reaction being intense and injurious. We know that if a gun-ball is lodged in an elephant's tusk there is a very extensive reaction around it. The gun-ball is a foreign body, and if it remains in the elephant's tusk for a sufficient length of time the dentine immediately surrounding it will present an appearance entirely different from the original or primary dentine. It is not translucent; has not the same consistence and elasticity that belong to primary dentine. This remarkable phenomenon was first studied, in the last century, by the celebrated German philosopher Goethe. He, in his curious way, called this reaction condensation of the dentine; and one hundred years later we are not much further advanced than that. But we know to-day that the tissue formed around the gun-ball in the elephant's tusk is the result of inflammation in the dentine itself; that this process first returned the tissue to its embryonal condition, as is the rule with all inflammatory processes, and then produced a new tissue, different from the original, but hard and brittle, forming a kind of protection for the normal dentine in the neighbourhood of the gun-ball. Even a name for the process of inflammation of the dentine is as yet lacking. Dr. Bodecker has suggested the term "eburnitis," or inflammation of ivory, and I do not know of any better. This inflammation may be beneficial if it is brought to bear upon a foreign body in a limited degree only, or it may be very detrimental if it is extensive and carried very far down into the pulp-tissue, causing reaction and so-called pulpitis.

At last I have reached the topic that I wish to dwell upon. Looking over a large number of specimens of teeth, and examining both the dentine and the enamel, we are struck at once by the fact that the caliber or breadth of the dentinal canaliculi varies greatly in different teeth. In the first place, the temporary teeth have very much wider canaliculi than those of adults, and, necessarily, there is more living matter in the former ones. Secondly, we see that the dentine of persons whom we are accustomed to consider rather sickly and weakly, pale-looking individuals, as a rule has wider canaliculi, with more living matter and less lime-salts, than is found in the teeth of robust and strong persons. Quite recently Dr. Abbott has made in my laboratory some studies concerning the minute structure of the enamel in its pathological bearings upon the question of caries, and I was perfectly amazed on seeing the beautiful structure-changes exhibited in a great variety of specimens of the enamel. This investigation shows what an important factor the structure of the enamel is in the problem of caries and its pathology.

Let us bear in mind one thing, that the more living matter there is present in a certain tooth the less are its lime-salts, and the greater the probability of any irritation being extended down to the pulp-chamber, simply because the dentinal canaliculi are wider and contain more living matter, and the conduction will be quicker than in cases where the canaliculi are narrow and the fibres of living matter very thin, the deposit of lime-salts or basis-substance being greater. But do not imagine, gentlemen, that the deposit of lime-salt in the teeth is unchangeable, even in the adult. It happened to myself two years ago, after a terrible ordeal in my family, the loss of a beloved child,—I being broken down bodily and mentally,—that my teeth, which pretty strong naturally, became so soft that Dr. Bödecker in working upon them could tell the difference at once. I do not question the assertion of expert and observing dentists, who claim that it is possible from working upon the teeth of a lady to diagnose the condition of her uterus,—whether it is healthy or not,—because sickly persons cannot have as much lime-salts as the strong and healthy. This the dentist will notice at once, his sense of touch being so delicate from working upon so many different teeth. This fact shows, therefore, that the teeth are under the control of general nutrition, and that if there had been originally present a great amount of lime-salts in a person's teeth, and comparatively small threads of living matter, under certain circumstances the lime-salts may be dissolved out and the dentine softened down in a comparatively short time. How much more soft and imperfect are the teeth of persons who were sickly or not properly nourished while the teeth were forming, and where there has not been originally a proper deposit of lime-salts! To be sure, the soft material of such teeth is easily accessible to decay, and reacts upon the least irritation.

What can we learn from these observation under the microscope concerning reaction in teeth? In the first place, we find out the degree of consistence of the dentine. Should you notice that the dentine upon which you work is lacking in lime-salts, you must, I think, subject such teeth to an entirely different treatment from that which you might employ upon teeth well supplied with lime-salts. If you have to deal with temporary teeth, which hold less lime-salts than the teeth of adults and far more living matter, I should say, speaking from theory, that you cannot work with the same material upon them that you can upon teeth of adults. If you do so, the punishment will come very soon. A material which, if placed in the tooth of an adult, produces but comparatively little reaction, or eburnitis, if placed in the tooth of a child, will be very likely so cause intense irritation and severe inflammation extending to the pulp-chamber and resulting in pulpitis.

The example to which I called your attention, the elephant's tusk with the gun-ball in it, serves as an illustration of the effect of all fillings that are inserted in teeth, for every filling of a tooth is a foreign body, and as such must necessarily produce more or less reaction. This reaction will be beneficial if its result, as in the case of the gun-ball in the elephant's tusk, in establishing a protection to the neighbouring dentine by forming a wall around the foreign body; but if the reaction be too intense, and goes too far down into the pulp-tissue, it will be very detrimental. When I saw these features under the microscope, I began to understand why gold filling are no longer recommended for temporary teeth, or at least are not resorted to as often as they were a few years back. Gold fillings are, to be sure, good in their place; but I doubt whether gold is a proper filling for temporary teeth, for the reason that the material is so heavy, and the force to be applied in putting it in is too great for the temporary teeth. I believe that two or three years ago I had the pleasure of mentioning before a number of gentlemen of your profession the fact that researches has led me to conclude that gold fillings were not the best fillings to be placed in temporary teeth, and I was informed during the last season by a number of dentists that they have given up the use of gold for temporary teeth almost entirely. I think you will also find when operating upon the teeth of pale, puny, sickly individuals, that the dentine is softer than it ought to be. If this be the case, do you not think it would be a wise plan to adopt a filling material which would produce the least injury to the neighbourhood of the cavity? Of course, you can excite inflammation artificially and purposely before putting in the filling, by applying a caustic of some description which will produce inflammatory reaction, leading to eburnitis and consolidation of the dentine, and then on top of that you might put your filling,—a plan that I am told is largely adopted by your profession. The cavity is first filled with some caustic that produces inflammation, and forms a hard wall around the cavity; and after the lapse of a few months or years this provisional filling is taken out and replaced with a gold filling. It is a wise plan, I should say, in cases where there are lime-salts enough to produce active inflammation; but I can realise that in many instances such treatment might produce too extensive inflammation and pain, which might necessitate the removal of the tooth.

I have observed that the teeth, though built up upon one and the same general plan, yet show innumerable varieties in the details of this plan. It was first observed that temporary teeth have wider canaliculi, and more living matter and less lime-salts, than teeth of adults. Next we come to settle the fact that the teeth of strong and healthy persons have more lime-salts and less living matter than those of persons in a sickly and run-down bodily condition. These facts established, we must arrive at the conclusion that it is not a wise plan to apply one and the same method of treatment to all kinds of teeth. You should be judicious in the choice of your method of filling teeth. There are teeth which need the most gentle treatment and the mildest filling material. In a general way the temporary teeth belong to this class, and also the teeth of persons who are in poor general health; whereas, in the cases of strong and robust adults, you can risk the use of almost anything without danger of inducing very severe reaction. Fortunately for the dentist and for his patient, such irritation sometimes leads to the formation of secondary dentine. Is it not perfectly marvellous to see that an operation upon a tooth which extends very near to the pulp-tissue is attended by a reaction which leads to the formation of new dentine,—namely, a protective wall against new injuries; and if the dentist is lucky enough to work upon the tooth after the secondary dentine is formed, his chances are better than if he worked upon the tooth before such secondary formation had taken place, and when he would be likely to reach the pulp-chamber.

These are merely general outlines of what I have learned from the microscope concerning the practice of dentistry. I do not claim any merit for them; but what I claim is that the microscope will, even to an unpracticed mind, open new views and widen the field of mental vision; will broaden our views in general, and help us to be successful in practical work. It has been my good fortune to be supported in a very handsome manner by many gentlemen of your profession; and I can almost boast of the success of my laboratory among dentists. If you ask why that is, the answer is plain enough, for, so far as I have seen, the art and science of dentistry is far more advanced in America than in any other country, and the desire to look into things a little deeper, to learn how the material upon which you work is constructed and to deduce conclusions from such studies, is far more developed in this country than anywhere else. Considering the difference between the previous methods of grinding specimens and that which we adopt, we should not be surprised to see that there is a greater interest in such studies in this country and better results obtained than elsewhere. To maintain that progress in dentistry, and in knowledge of the anatomy of the teeth, is possible only upon the ground I have taken,—namely, that the teeth are altogether composed of living tissues which react upon irritation. That man is the best and most successful dentist who knows how the tissue upon which he works is constructed, and who can estimate the degree of its reaction upon his work.

THE TEETH AND THE EYES.—Dr. M. L. Jackson, speaking in the *Iowa State Dental Society*, says :—"Two years ago a gentleman came to my office troubled with a sore eye, five years previously he had the root of the central incisor filled by some process, but it was knocked loose, and troubled him. He went to a dentist in Adrian, who opened it, he claimed, to the end of the root, treated it first and then filled it. Six months afterward this gentleman was taken with severe pain in his right eye ; that pain continued, and finally settled into an inflammation. He went to Chicago to have it treated ; was there some three months, with some improvement. He came back, and the eye became worse. I examined the tooth above referred to. It was not bad looking ; it only showed discolouration ; I tapped on it a little, and he immediately flinched. I took the filling out and did everything I could to save the tooth, but finally extracted it, and found it had been filled only one-third to half way up. The end of the root was honey-combed a quarter of an inch. Two days afterward the pain had left his eye, and a month after it was well, though the pain in his eye had been running for five years.

THE OAKLEY COLES' TESTIMONIAL.—We understand the committee and supporters of the fund inaugurated to furnish a testimonial of respect to Mr. Coles, presented to him the proceeds of the fund, viz., one hundred guineas. Mr. Coles made a suitable speech in response.

British Journal of Dental Science.

LONDON, MARCH 1st, 1886.

DENTISTS AND FEMALE PATIENTS.

There have been so many victims to the diseased imagination of hysterical women, among medical men that one is naturally inclined to ask, are we also liable to charges which are as easily made as they are difficult of refutation. The most innocent man might, it is stated upon excellent legal authority, at some epoch of his life, be found guilty of divers and sundry heinous offences, were circumstantial evidence alone admitted or great stress placed upon it. The absent man, the careless man are one and all most likely to say or do something capable of the maddest misconstruction. We have known a portly gentleman, a barrister, seriously ruffled at his own dinner table by the loss of a silver fork. Seeking high and low failed to discover the utensil until, upon shifting himself, the barrister shook the fork from his own sleeve. Had this occurrence been at a friend's house and had the barrister been impecunious, the conclusions drawn by unkind people might have been far from flattering. So it is with dentists. Of course ladies seldom, if ever, come to see us alone, but all rules have exceptions and the exceptions often prove troublesome. Whatever be the nature of the work to be done it should be a rule, as unalterable as though fulminated by Medes and Persians, that some attendant, preferably a woman, should be within earshot. It is unfortunately uncommon in this country to seek the aid of ladies in our work as dentists, were we more prone to the custom of having a lady assistant we should have no embarrassment. Medical men are getting more and more cautious of seeing ladies unless in the presense of a third person, and this plan should, we hold, be kept rigidly among dentists. Should a lady come unattended the attendance of an assistant should at once he sought for, and the witness, whether a domestic servant, secretary, or what not, should be placed in a situation when all sounds, and if need be scenes can at once be recognised. Most dental ateliers have some abutting ante-room which can be shut off by a curtain. In such a recess some one should always sit and be able at any time to give evidence as to what was going forward in the operating room itself. We say this solely in the interests of the profession, we believe and we trust that the public need entertain no fear or anxiety as to their safety when committing themselves to their dentists. A large number of ladies especially among the indolent and luxurious are liable to hysterical paroxysms, to hysterical hallucinations and all the consequences such conditions are apt to entail. These poor victims are really not answerable for their behaviour. The facts to them are what their imagination pictures them, reasoning is thrown away upon them as the more cogent your arguments may be the less will they seem to accept conclusions which appear to you as mere corrolaries upon your premises. And again many ladies suffer from fainting fits. The mere passing glimpse of a pair of forceps uncautiously left exposed will, in some cases, produce a fainting fit. With such patients the dentist should never be left alone, in everyone's interest it is most important that succour should be instantly and skilfully applied. We need hardly speak here of cases when anæsthetisation becomes needed. It is difficult to imagine any dentist whether or not he felt justified in administering the anæsthetic allowing himself to do so single handed, running the risk of injuring his patient should any untoward event take place during narcosis, and again running the risk of being accused by the patient of every crime from picking her pocket upwards.

It is all very well for us to say, oh such a case will never occur to me. The laws of averages are very accurate, and you never know when you are engaged upon any patient what will eventually occur.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.—The next meeting of the above Society will take place at the rooms, 40, Leicester Square, on Monday, March 1st, at 8 p.m. Casual Communications—Dr. W. St. George and J. C. Foran. Paper.—"Physiological action of Nitrous Oxide." By Dr. Dudley Buxton.

Dr. Anton Kozura, of Buda-Pesth, says that aconite is an obtunder of sensitive dentine. He uses the alkaloid in a concentrated solution in ether, saturates a small piece of Japanese bibulous paper, lays it over the entire sensitive surface of the cavity and covers with gutta-percha. After the lapse of twenty-four hours or so, the cavity may be painlessly excavated, "provided there is no inter-current." It is essential for success that the interior of the cavity should be even, so that the remedy will penetrate to a uniform depth. This we accept upon the authority of the *Dental Register*.

In a letter published in our last issue, from the Secretary of "The General Dental Defence Association," some words were inadvertently omitted. The substance of our correspondent's communication goes to show :—(1.) That the Medical Council have not administered "The Dentist's Act," according to the spirit of the law. They quote Sec. 7 literally, ignoring the fact that Sec. 7 is negatived over and over again throughout the "Act." (2.) That there is no appeal to the Privy Council from the decision of the Medical Council. That the former body also displays a "penchant" for Sec. 7, neglecting to observe such sentences as the following elsewhere in the Act :---*Persons who are entitled to be registered* : "Any person who can prove he practised as a dentist prior to the Act is to be registered," *i.e.*, the law protects his vested interests. *And again*, what shall he pay to be registered ? "Those persons who apply to be registered before Dec. 31, 1878, shall pay a fee of £2. (*Now mark*, and here is the pith of the contention.) *After that date*, a fee of £5. In this clause no limit of time is fixed. (3.) That the British Dental Association when applied to, to assist in ventilating the grievances of those debarred from registration, refused co-operation ; indeed, returned the communication unanswered.

We have received Caulk's Annual for 1885–6. It is up to its average merit and that is saying a good deal, for we know no production which equals Caulk's Dental Annual in its particular line. The opening sentence is "The Cocaine furore, like 'the proverbial dog,' has had its day." We note that among the extracts one giving the mortality for various anæsthetics and bi-chloride of *methyline* (sic.) is given as 1 in 7,000, this is not accurate and methylene is after all a mixture of chloroform and alcohol and should be so called.

THE CASE OF MR. JACKSON.—We publish in our correspondence, a communication from Mr. Jackson, senior. His cause is pleaded by the Secretary of the General Dental Defence Association, and we accede to his request for publication. We should suggest that a fund be started and subscriptions be received by accredited officers; this would surely be better than dividing the strength of the executive between the Defence Association and ourselves.

THE INTERNATIONAL MEDICAL CONGRESS.—From reliable sources we learn a considerable amount of information about the progress reported up to date. We shall devote some space shortly to considering the position now adopted by the American dental profession and its bearing upon our conduct with respect to the congress. At present, we confess, it seems to us that there is every chance of a great and good meeting taking place in the oral section, and we trust no jealousies and mere cliquism will be permitted to stand in the way, of the success of the assemblage. There can be no doubt that an international meeting of dentists might be made to subserve the best and highest ends, and it is our trust that the congress of 1887 will prove the truth of our remarks.

Abstracts of British & Foreign Journals.

THE DENTAL REGISTER.

REMINISCENCES.

By C. G. VON BONHORST.

The paper deals with dental doings of old. In the jaws of many disentombed skeletons of ancient date, evidences of filling as well as loss of teeth, by extraction, have been found, also artificial dentures remaining in the jaws, so that dentistry was known and practised by the Ancients; the instruments then used for dental operations were very rudimentary. Even fifty years ago dental implements were in a very unsatisfactory state. The writer remembers forceps that broke as many teeth as they pulled out. Of artificial teeth, he says: I remember, too, an old dentist, who, when he wanted to insert upper front teeth, did not go to a dental depot and select such teeth as might be required for the case, but went to his butcher and asked him when he was going to kill another sheep, as he wanted some more teeth. These he cut the roots from, then drilled holes in them, and inserted them on hickory pivots. But he was a genius; graduated from a barber's shop to the dental chair. About 1844, a so-called dentist came to Pittsburg, and astonished the natives by hawking from house to house ready made dentures. The invention consisted of teeth, mounted on flat, gold wire, about an eight of an inch wide, and about half as thick, having from one tooth up to six. It was only applicable to the loss of the six upper front teeth—and then only when the roots remained in the jaw. The fixture was kept in place by gold pivots inserted in the roots—no roots, no teeth.

Tin foil was the chief filling material used, gold being too expensive; amalgam was also employed, but was liable to become quite black.

His first experience with gold foil was with some made by an old English gentleman. It was what now would be termed soft foil, and made good fillings. About this time, the then great problem of air chambers in dental plates came to notice. A dentist astonished the toothless by claiming to have a system of inserting teeth without plates. However, his plan was different from the one now advertised; his teeth were made much like S. S. White's biscuited teeth for porcelain work are now made, with roots, and the roots ribbed crosswise of the tooth. His method was to select a tooth the size, as near as possible, of the one to be extracted, then introduce it in the jaw, when the other was extracted, bind it to the natural teeth, and allow the gums to heal. None of them remained permanently. He gives some experience with a gutta percha covered tin plate, warranted not to cut in the eye. On the recommendation of a good old dentist in Cincinnati, since passed away, I put up an upper and lower set of teeth on this new base, for the wife of a prominent judge in Virginia. Some months after, he wrote me that the plates stuck first rate, but thought they were getting black ; so I thought when I again saw them. I, however, with the best grace I could assume, substituted a set of continuous gum teeth.

Each man had his own particular method of treating pulps whilst some had none at all. A furore was excited by the announcement of the achievement of contour fillings. It bid fair to swallow all other discoveries in dentistry. Building up with gold an old tooth, with top, bottom and sides gone. Yet by the simple " rule of three," little retaining points, the mas of gold restoring size and shape of original tooth was to be held *in situ* for all time. This operation, he adds, does not seem to be so popular as it was, especially with the patient.

He closes his paper by recalling the introduction of the rubber dam, an invention which does more for the dentist who conscientiously feels inclined to do good filling, than all other inventions ever made for that purpose.

GAS FURNACES *V.* COAL OR COKE.

By H. C. Land.

The gas furnace for dental operations is destined to supercede the coal or coke. Heretofore the serious trouble with gas furnaces has been the liability to injure the colour of the body and enamel. He proposes to obviate this trouble, by a very simple method. In the use of the various hydro-carbons which are at our command olefiant gas, gasoline, are the most available, from which we must secure the necessary degree of heat. He describes his method as follows : Draw three parallel lines, an inch apart, one above the other, to represent the interior of the furnace, estimate the burners as being set one inch beneath. The first line will represent the bottom of the muffle, the next line one inch higher on the outside of the muffle, and the third line the top of the muffle.

We have here 1st, 2nd, and 3rd stages of combustion. In the inch below the muffle one atom of oxygen is taken up, producing di-oxide of carbon ; in the next stage two atoms of oxygen unite, producing mon-oxide of carbon, and in the third and last stage, three atoms of oxygen are taken up producing carbonic acid, this is perfect combustion. To procure 2,800 degrees of heat it is necessary to have a bellows that will supply a constant blast of one pound pressure to the square inch, and this force is capable of driving the di-oxide of carbon completely through the pores of the muffle, especially when it is driven directly against the bottom, this product enters the body and remains in it, and as it takes about 2,800 degrees to eliminate di-oxide of carbon—the biscuiting being completed at a much lower degree—therefore, when the case is subjected to a degree of heat sufficient for enameling, this di-oxide or it may be mon-oxide of carbon, comes out in the shape of numerous small bubbles, this is what we call gasing the teeth. To overcome this difficulty his first step was to force a current of heated air into the muffle and in this manner drive the di-oxide of carbon out, however, too much air from the excess of oxygen also bleaches the enamel. Pure nitrogen is injected into the muffle, it being a neutral gas, was eminently successful and demonstrated the fact that porcelain baked in an atmosphere of pure nitrogen is absolutely perfect. He secures the nitrogen in a simple way, but does not describe his method. He states a case : A lady called at my office with her seventeen-year-old daughter, both the superior lateral incisors were not more than one-third their proper size, and in contrast with the other well developed teeth were a disfigurement. To remedy this trouble, two platinum tubes were fitted over the teeth ; the next step was to take two ordinary plate teeth and grind them to mere shells, this secured the size and colour, then they were baked to the tubes by using a little fresh tooth body, the result was a complete success, the joint at the margin of the gum could not be seen. The subject of this circumstance tells her schoolmates that her teeth have overcoats on.

The next experiment will be some porcelain and platinum bridgework by stamping the cusps of molars and bicuspids, then fill them with body and bake, then solder them on to the bridge work. After this is done take the ordinary plate teeth, grind the crowns down so that they are level, then fit them to the bridge-work, the whole can then be placed in the furnace and by previously filling all the interstices between the teeth and the platinum crowns a most beautiful piece of bridge-work can be secured.

Correspondence.

We do not hold ourselves responsible for the opinions of our Correspondents.

GENERAL DENTAL DEFENCE ASSOCIATION.

To the Editor of the British Journal of Dental Science.

SIR,—Not long ago, the medical profession restored a falsely-accused brother to liberty, re-established his honour and integrity, and loaded him with gifts, because they were truly convinced of his value, his honesty, and his moral character. In the perusal of enclosed letter, which you had better have printed, you will find a brother of ours falsely and foully accused of a heinous offence; and I ask you and I ask the profession :—"Will you stand coldly by, and allow this wrong to be enacted?" Let a general and a generous subscription be raised—I am certain all will give—and let the innocent be avenged, and the guilty suffer. Perhaps you will be good enough to open a subscription list at your office, as we have already done here.

I am, Dear Mr. Editor,
Yours truly,
J. ABBOTT, Hon. Sec.

General Dental Defence Association,
Queen Street, Exeter. Feb., 1886.

P.S.—I must add that I wrote to the British Dental

Association to co-operate in our laudable effort, but my communication was returned unanswered.

Letter received by Secretary of General Dental Defence Association

My Dear Sir,—Yours to hand this morning. I thank you very much for the kind sympathy therein expressed. I may say that all the medical gentlemen and the general public are in sympathy with me in the great ordeal my son and I have had to pass. I presume you will have read the report of the trial in full in the newspapers. If you have not been able to see one containing a full report, I shall be most happy to forward you one. The facts of the case are these. On the 19th of August last (I being out at the time) three persons, viz., the plaintiff, her father and her brother, came to my place and inquired for me; being told by my daughter that I was out. They then asked for my son, the defendant. He came out of the workroom to them when they requested to speak to him in the waiting room; he attended them in the said room, when they requested him to shut the door, which he did, shutting out my daughter who answered the door, and was then standing in the passage. The young lady's brother then asked my son if he knew the young lady. My son answered "No." "Have you ever seen her?" My son said, "not that I remember." He was then asked if he ever administered ether to her, and he replied, "I have never administered ether in my life." He was then asked if he had administered gas to her. My son answered, "Not that I am aware of." The young lady's brother then said, "We have come to charge you with committing a rape upon this young lady while she was under the influence of gas." My son said, "I have never done such a thing to that young lady, nor to any other lady in my life, and you are making a very dangerous mistake." The three persons then left the room, saying, that a warrant would be got; they would have him arrested, and brought before magistrates. My son said, "Very well, I will see my solicitor." This took place on the 19th of August. My son saw me about half-an-hour afterwards and told me what had passed. He was much distressed about it (he being under medical treatment for general weakness at the time).

We did not hear anything further until the 31st of August, when I received a letter addressed to my son, wishing to know what he intended to do in the matter; stating that the young lady was in the family way, and that my son would have been prosecuted under the more serious charge of rape, had the young lady told her friends of the occurrence sooner, and that the offence complained of was committed on the 11th of February. So you will see six months had elapsed before she made the charge. By this time the slander got circulated very much. My solicitor wrote them, stating that if an apology was not given, proceedings would be taken against them for slander, which apology they refused to give. Proceedings were taken against them accordingly, with the result of which you are acquainted. I may say, that on October 9th the child was born; the fact coming to my knowledge three days after. I sent two medical men to see and examine the child, who swore that the baby was a full-grown and well-nourished child, with other indications of full development. The medical evidence no doubt you will have read.

Our case is—she was never in our surgery on the day named. That such an outrage could not take place under nitrous oxide, the anæsthetic effect being too brief. That such an outrage could not take place in the chair. It is a Morrison's dental chair, we have never used any other anæsthetic agent in our surgery. Then comes the improbability of her story uncorroborated by any incident. I have been engaged in Burnley professionally for twenty years. I have administered the gas daily for 17 years. I have a good connection and I am personally acquainted with every medical gentleman in Burnley, and have administered the gas in the presence of many of them. Many have called this last few days to sympathize with me in my trouble. I don't know what to do in the matter. I have been at a great expense and trouble; some of my friends advise me not to take further action. But in the interests of the profession such a charge should not be allowed to drop, without the person being brought to justice. It is a case without precedent, and such an improbable and impossible charge, that it ought to have the censure of all reasonable people. You will notice the charge was made about the time of the revelations in the *Pall Mall Gazette.*

The above are the facts briefly but truly stated. I am impressed with the serious fact that every member of our profession is at the mercy of designing women.

Thanking you for your kind sympathy and interest,
I remain,
Yours truly,
23, Hargreaves Street, Burnley. T. JACKSON.
Feb. 10th, 1886.

Dental News.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Annual General Meeting, January 11th, 1886.
C. Spence Bate, F.R.S., President, in the Chair.

The Minutes of the previous meeting having been read and confirmed,

The President declared the ballot open for the election of office-bearers for the current year, and Messrs. E. Bartlett and W. Hern were chosen in the manner prescribed by the bye-laws to act as Scrutineers of the Ballot.

The President announced that the following gentlemen had been duly nominated as candidates for election, and would be balloted for at a subsequent meeting, viz. :—

Messrs. W. J. England, L.D.S., Eng., 40, Wimpole Street, Cavendish Square, London ; and
Thomas Frederick Barton Palmer, M.R.C.S. & L.D.S., Eng., Priestgate, Peterborough.

The following candidate was balloted for and elected a non-resident member of the Society :—

R. L. Markham, L.D.S.I., 19, Eldon Square, Newcastle-on-Tyne.

Mr. S. J. Hutchinson related the following case, which, he said, although not a very uncommon one, still presented some points of interest, and might therefore be worthy of the attention of the Society.

In October last a gentleman came to him suffering from almost complete closure of the jaws; he could only separate them about a quarter of an inch, and was, of course, unable to eat. He had been in this condition about a month. Mr. Hutchinson found that the inability to move the jaws was due to muscular contraction, with infiltration and induration of the surrounding tissues, and diagnosed an impacted wisdom tooth, but was unable to make a satisfactory examination of the mouth.

At the patient's next visit gas was administered and the jaws separated to some extent by a screw gag. It was then found that the left lower wisdom tooth was completely buried under the ascending ramus of the jaw; it was also decayed and had an abscess at the root. In order to get at it Mr. Hutchinson felt obliged to extract the adjacent second molar, and this was at once done. After an interval of a few days gas was again administered and an attempt made to dislodge the wisdom tooth, but the patient recovered himself before this could be effected.

Perceiving that the operation would be a difficult one, Mr. Hutchinson arranged with the patient that he should have chloroform at his own house, and this time the tooth was successfully extracted, though not without a good deal of trouble, for the tooth was lying horizontally and buried under the ramus of the jaw.

Mr. Hutchinson thought that the plan of administering chloroform at the patient's own house, instead of at that of the practitioner, reduced the risks and inconveniences of this agent to a minimum. The patient could be operated on undressed and in a recumbent position; he was not fatigued, as he might be when he had to come some distance in a fasting condition, and he was less flurried. Finally, he could lie quietly after the operation and recover himself at his leisure.

Another point of interest in the case was the length of time the contraction persisted after extraction of the tooth. Three weeks after the operation the patient could only open his mouth three-quarters of an inch, and he had, in fact, only just regained the free use of his jaw, though the operation took place in October.

Mr. Charters White said that about two years ago he had been called upon to treat a precisely similar case. Thinking from the amount of indurated swelling, &c., that there must be some disease of the jaw, he sent the patient to Mr. Christopher Heath, but that gentleman sent him back again, saying he considered it a case for a dentist, and on examining the patient more carefully Mr. White discovered that the cause of the mischief was an impacted wisdom tooth, embedded in the ascending ramus of the lower jaw. The patient could not separate his teeth more than a quarter of an inch, so that it was difficult to introduce forceps, and still more so to manipulate them in the mouth, but Mr. White managed to reach the tooth with some long narrow curved forceps, and to raise it out of its socket, and at the patient's next visit, the swelling having somewhat diminished, he succeeded with the same forceps in removing it altogether.

Mr. Henri Weiss said that in five or six cases of prolonged operations in the mouth, he had used the well-known A.C.E. mixture, composed of alcohol one part, chloroform two parts, and ether three parts, by measure, and had found it act very satisfactorily. The patient recovered quickly, and there were no bad after-effects.

Mr. R. H. Woodhouse said he knew that the extraction of lower wisdom teeth was sometimes attended with a good deal of difficulty, and he believed that this arose from over-looking the fact that these teeth, when misplaced, were almost invariably inclined to the inner side of the ramus. He found that by inserting an elevator on the outer side, and making a continuous movement inwards, he could dislodge them without any trouble. He believed the difficulty arose from making an outward movement; it should be entirely inwards.

Mr. A. S. Underwood said he feared the communication he was about to make would be considered "dry" by many of those present, since it would only be interesting to those who were fond of microscopical investigations.

In the years 1878 and 1879, Dr. Bodecker, of New York, published in the *Dental Cosmos* some papers on the microscopical anatomy of the teeth, in which, amongst other things, he asserted that the presence of protoplasm between the fibres of the enamel could be demonstrated by staining sections with chloride of gold. He described his process as follows :—He first decalcified the teeth by means of chromic acid, then cut sections, and stained these by placing them in a solution of chloride of gold, and exposing them to sunlight for twenty-four hours or more. Now up to that time it had always been stated that chloride of gold would only stain tissues which were absolutely fresh. The text-books said it was useless to attempt to stain tissues which had been deprived of life for more than an hour, and a distinguished microscopist to whom Mr. Underwood applied for information on the subject, replied that it was hopeless to attempt staining with the chloride unless the tissues were fresh, and even in that case four out of five of his sections would turn out failures.

Wishing to verify Dr. Bodecker's observations, if possible, Mr. Underwood undertook a series of experiments in order to ascertain whether it was possible to stain decalcified sections with this reagent, and what was the best method of using it.

His results with the method decribed by Dr. Bodecker had been uniformly unsatisfactory ; he could not get a single section which showed anything clearly. But he found, nevertheless, that any section could be stained, and that it really did not matter whether it was fresh or not. The method which he had found the best, and which he had finally adopted, was as follows :—

He immersed the section, whether cut from a decalcified tooth or ground down from a hard one, in a solution of carbonate of soda for an hour. Then he placed it in a solution of chloride of gold, *which must be neutral*, and left it in the dark for another hour. It was then again placed in the carbonate of soda solution for a few minutes, and then transferred to a one per cent. solution of formic acid, and kept warm over a water bath for about an hour and a half. Finally the section was mounted in glycerine jelly, *not* in Canada balsam. Sections which had been decalcified by chromic acid took longer to stain than those which were fresh, but the whole process only occupied from three to four hours, instead of at least twenty-four as in the old method, and the result would be found far more satisfactory. The usual needles, or any steel instruments, must not be used for manipulating the sections; some non-metallic substance, such as a quill tooth-pick, should be used instead.

He found that the most satisfactory method of grinding down hard sections was to grind them tolerably thin against a find corundum wheel and afterwards to finish with an Arkansas wheel. In this way the section could be ground down to any required thinness with little risk of injury.

Mr. Charters White said he gathered from Mr. Underwood's remarks, that though it was possible to stain a decalcified section, it was better to grind down a fresh section and stain at once.

The President remarked that grinding down a hard section between two Arkansas stones saved both the operator's time and his finger.

Mr. Underwood replied that fresh sections were not only easier to stain, but were in all respects much more satisfactory than those which had been decalcified, since the former presented the tissues in their natural condition, whilst in the latter they were more or less affected by time and by the reagents. Consequently, when decalcified specimens were used, there was always a doubt whether the appearances seen were really natural, or whether they were the effect of the reagents. He thought the use of the finger was the safer way of finishing a thin section, and if necessary the finger could be protected by attaching the section to a piece of cork or rubber.

Dr. George Field presented to the Society some samples of Dennison's absorbent cotton, an American preparation. He had given it a thorough trial, and was convinced that there was nothing which surpassed it as an absorbent for dental purposes.

He wished to suggest a new use for cocaine—new, at least, to some of those present—viz., in the fixing of the rubber down by means of a ligature round the tooth, especially in the cases frequently met with where it was necessary to force both the rubber and ligature between the tooth, or teeth, and gum, on the approximal and buccal surfaces of the former. His method of using it was as follows :---He first thoroughly dried the cavities and the adjacent gum margins, then by means of a wedge-shaped piece of wood he applied the cocaine between the teeth and the gums, first adjusting a napkin as a protection from moisture. He preferred to use the crystals. Then he prepared the rubber, elastic bands, weights, ligatures, &c., and when everything was ready to hand he made another application of the cocaine. On now proceeding to adjust the dam, it would be found that the ligatures could be forced well under the gum with but little, if any, pain to the patient, provided that the application had been properly made. This operation, which, though absolutely essential for the success of fillings in the positions named, was usually exceedingly painful, was thus rendered almost painless ; a good view of the margins of the cavity was thus obtained, with dryness, and it greatly facilitated the removal of all surplus material overhanging the margins of the cavity, an oversight which, in his experience, was the cause of more failures than any other defect in filling operations.

Lastly, if not taking up too much time, he would venture to offer a few remarks on the question of the extraction or the retention of roots. When should roots be extracted, when retained ? When was it advisable to pivot, and when not ? His remarks on this subject must necessarily be very general.

Preparatory to the insertion of an artificial denture all roots which could not be put into a good healthy state, fit to receive a crown, should be extracted. In the case of patients who, it might reasonably be expected, would not take sufficient care to keep their teeth, roots, and gums in a cleanly condition, it was wiser to extract all roots : otherwise in from six to twelve months the result of the want of judgment would be seen in swollen face and gums, abscesses, &c., and a state of mouth generally which was a source of great discomfort to the patient himself, disgusting and offensive to his friends, and discreditable to the operator.

He expected to meet with the usual objection—the consequent absorption of the alveoli, &c. But this should have no weight in comparisen with the inevitable bad results just named ; in addition to which there could be little doubt that the quantity of suppurative matter constantly passing into the stomach must be prejudicial to the health of many patients. If the roots of any of the ten anterior teeth of the upper jaw were strong, pivoting in the best possible manner should be given the preference over a plate, as being less liable to injure other sound teeth and of greater practical service, provided the operation be performed with even a moderate degree of skill ; giving special attention to the stopping of the foramen of the root, obtaining a good joint between the root and crown, having no shoulder either of root or crown, and lastly removing every particle of the cement used for fixing the crown which may have been pressed out at the joint.

Speaking from his own observation, he had never yet seen a case for the insertion of a full denture, the conditions or circumstances of which would warrant the retention of the roots ; whereas he had met with cases in which the retention of numerous diseased roots covered by a plate had proved prejudicial to the general health of patient.

He did not present these suggestions as being anything new, but rather to call attention to the fact, which at times seemed to be lost sight of, that the mouth should be treated in the same way as any other part of the body, and that it was the duty of the dental practioner to maintain it in a healthy condition by every means in his power, therapeutic as well as mechanical.

Mr. Storer Bennett showed a lower jaw, found at Bath some years ago amongst Roman remains, which had been presented to the Museum by Mr. Forsyth. On comparing it with a typical modern specimen several differences would be apparent, especially the distances between the condyles and the large size of the ascending rami. There was but slight mental development, and the teeth were not quite regular; they were much worn, but there were no signs of caries, and contrary to what might have been expected, the wisdom teeth were small.

Dr. Geo. Cunningham showed some specimens illustrating the difficulties and disappointments of Continuous Gum Work. He has used the same furnace (Fletcher's) throughout, the details of the process had been carried out in the same way and with the same amount of care, and yet after a period of success, when he thought he had conquered all difficulties, several cases in succession had turned out badly, the enamel being unequally fused and cracked on the outside of the plate. He could not himself explain the cause of his non-success, nor could he get any one else to explain it. The only difference between the good plates and the bad was in the enamel used, though both had been obtained from the same makers, and S.S. White Company, but that used for the successful cases had been on hand a long time, whilst new enamel had been used for the failures. He should be very glad if any one present could tell him whether their experience had been at all similar, or could enlighten him as to the probable cause of his failures.

He wished also to call the attention of the Society to Dr. Land's suction chamber; he handed round a denture made according to his pattern. Dr. Land's suction chamber was large but shallow. He himself had for some time past altogether abandoned the use of these chambers and used the Fulsome ridge, but lately he had been induced to make some comparisons between the two, and had found Dr. Land's method of great use, and he could therefore recommend others to give it a trial.

Dr. Walker said he had met with the same difficulty in firing continuous gum cases, using Verrier's muffles. He would suggest that the bad results were due to the unequal temperature of different parts of the furnace, and that this might be obviated by having a better supply of gas. He thought that if Dr. Cunningham would have a larger supply pipe fitted, not less than $\frac{3}{4}$ inch diameter, inside measurement the heat would be equalized, and he would meet with no more failures of this kind.

Mr. D. Hepburn called attention to the following plan for improving the adhesion of suction plates.

All must have experienced the difficulty which was not unfrequently met with in establishing the confidence of patients in suction plates, especially when first applied. Even with the most perfect model, the most accurately adjusted arrangement will often at the first offset show no tendency whatever to adhere to the gum, and the patient may have to undergo many days of discomfort before adhesion is established. He had tried to overcome this difficulty by coating plates with various substances of an adhesive nature, in order to spare the patient a disagreeable ordeal, and he was aware that similar attempts had been made by many other practitioners. Thus he had tried sprinkling the plate with flour and painting it with various gums and mucilages, but with little success, most of these substances being rapidly dissolved and washed away. For about a year, however, he had employed powdered gum tragacanth with the most satisfactory results. Indeed, the most refractory plates, when this substance was used, would adhere with a certain amount of tenacity, and frequently could not be dislodged without a considerable effort.

The best method of application was to keep the powder in a bottle with a piece of muslin tied over the mouth, and to sprinkle the plate with a thick layer of the powder before putting it into the mouth. The saliva would in a short time convert the tragacanth into a glutinous and almost tasteless layer which would remain for days. In obstinate cases the patients could themselves apply the powder daily, and found much comfort from so doing.

The use of tragacanth has been suggested to him by a patient of great ingenuity, and he had never met with any substance which would act so efficaciously. Having experienced its utility himself he wished to suggest its employment, for the purpose referred to, to other members of the Society.

Mr. R. H. Woodhouse said he had found powdered gum arabic of some use in such cases, but at the suggestion of Mr.

Hepburn he had lately used the powdered gum tragacanth and had found this very much better.

The Scrutators reported that they had examined the ballot papers and found that the list of office-bearers recommended by the Council had been unaminously elected. The list was as follows :—

President.

T. Charters White, Esq.

Vice-Presidents.

Resident : Messrs. George Gregson, Henry Sewill, and S. J. Hutchinson.

Non-Resident : Messrs. Richard White (Norwich), Andrew Wilson (Edinburgh), and Richard Rogers (Cheltenham).

Treasurer.

James Parkinson, Esq.

Librarian.

Felix Weiss, Esq.

Curator.

Storer Bennett, Esq,

Editor of the Transactions.

Frederick Canton, Esq.

Honorary Secretaries.

Messrs. David Hepburn (*Council*), Robert H. Woodhouse (*Society*), and Willoughby Weiss (*Foreign Correspondence*)

Council.

Resident Members: Messrs. W. St. George Elliott, Augustus Winterbottom, Samuel Cartwright, Morton A. Smale, J. Howard Mummery, Arthur S. Underwood, C. G. Boyd Wallis, E. G. Bet s, and J. F. Corbett.

Non-resident Members : Messrs. W. E. Harding (Shrewsbury), Robert Reid (Edinburgh), J. R. Brownlie (Glasgow), J. H. Whatford (Eastbourne), F. H. Balkwill (Plymouth), and George Brunton (Leeds).

The President then called upon the Treasurer for his Annual Report.

Mr. Parkinson said the report he had to present was satisfactory except in one respect, viz., that there had been a slight falling off in the numerical strength of the Society. Reports were also read by the Curator of the Museum, and also the Librarian who severally declared the condition of their department to be satisfactory.

The President having delivered his valedictory address, a vote of thanks was proposed.

Mr. Browne-Mason (Exeter) said he had been asked to propose a resolution, and the applause which had just followed the conclusion of the President's Address convinced him that the task he had been called upon to perform was not an unpleasant one. He moved that the thanks of the Society be given to Mr. Spence Bate for the able and efficient manner in which he had conducted the business of the Society during his year of office as President. The Society was honoured by having as its President a gentleman so distinguished for his scientific attainment. It was, however, quite unnecessary for him to enumerate Mr. Spence Bate's claims to their regard, and he would therefore content himself with formally moving the resolution.

Mr. Gregson said he had great pleasure in seconding the resolution. A few years ago the Society had endeavoured so to amend its rules as to become in reality, as well as in name, the Odontological Society of Great Britain. It was to this alteration that they were indebted for the honour of having Mr. Spence Bate as President, and he thought it was a very good thing for the Society that country members were now eligible for the Presidential Chair.

The resolution having been carried with applause, Mr. Spence Bate briefly expressed his acknowledgments. It had given him great pleasure to occupy the position he was then about to vacate. As for the change in the constitution of the Society referred to by Mr. Gregson, he knew that some doubts had been felt with regard to it, but he trusted that the interests of the Society had not suffered during his year of office, and hoped that the plan would work well in the future.

Dr. Walker moved that the thanks of the Society be given to the Treasurer, Librarian, Curator, Editor of the *Transactions*, Secretaries, and to the other members of the Council for their services during the past year. The best thanks of the Society were due to all its officers, but he would specially mention the Secretaries. No one who had not himself acted as Secretary could possibly form any idea as to what their work was like. Messrs. Hepburn and Woodhouse had discharged their duties most efficiently, and he was glad to see that they had consented to act for another year. He was sorry that they were about to lose the services of Mr. Hutchinson as Curator, a post which he had held for five years. During that time he had completely reorganized the Museum, which was now most admirably arranged, and the special thanks of the Society were due to him on his retirement.

Dr. Cunningham seconded the motion.

The President then announced that at the next meeting which would take place on Monday, February 1st, Mr. Bland Sutton, F.R.C.S., would read a paper on "Dental and Oral Cases in Animals."

The Society then adjourned.

THE VICTORIA DENTAL HOSPITAL.

The annual general meeting of the governors of the Victoria Dental Hospital of Manchester was held on the 24th ult, in one of the committee-rooms of the Town Hall. The Roman Catholic Bishop of Salford presided. There were also present Mr. W. A. Coppinger, Dr. Frank A. Huet, Mr. Alfred Crewdson, Mr. C. Waterhouse, Mr. G. W. Williams, Mr. J. Williams, Mr. J. Dreshfeld, and others.

The second annual report of the Committee of Management, which was read by Mr. H. L. Knoop (hon. secretary), states that the attendance of patients in 1884 (from March to December inclusive) amounted to 2,720, whereas during the year 1885 the number was 8,618. The average morning attendance in 1885 had been exactly double that of 1884, and the average evening attendance had more than trebled during the past year. One of the objects which the founders of this hospital had in view in its formation has to a certain extent been attained, or at least developed, during the past year, and the hospital may now be regarded in the light of a school of dentistry in connection with the Owens College. The committee are glad to be able to report that lectures in dental surgery are now given at the Owens College School of Medicine, and that a number of students who attend these lectures receive their practical instruction at this hospital. The growth of the hospital, both as a charity and as a school, has been so great that the committee consider the time to have arrived for appointing a dental house surgeon. The Dental

Committee call particular attention to the constantly increasing attendance of patients, as shown by the following comparative statements of the years 1884 and 1885 :—In 1884, 2,720 ; 1885, 8,618. The average daily attendance of patients was as follows :—In 1884, 16 ; 1885, 43. The summary of cases treated during the year 1885 is as follows :—Boys under 14, 1,966 ; girls under 14, 2,332 ; men, 1,526 ; women, 2,794 ; total, 8,618.

The Chairman, in moving the adoption of the report, said he begged to congratulate the meeting on the great success which had attended the institution. He remembered some two years ago, when many persons were spoken to on the subject of the establishment of such an hospital, some were of opinion that an institution of the kind was not required, and would rather press on the charity of the people and was more than was needed. The result, however, had proved the wisdom of those who had determined to carry out the project. He knew from his experience among the poor that they suffered greatly from affections of teeth, and that the advantages of such an hospital were highly valued. Owens College having become associated with the hospital was also advantageous.

Mr. Frank A. Huet seconded the resolution.

On the motion of the Chairman, seconded by Mr. Kinnell, a vote of thanks was accorded to the committee of management and the honorary officers of the institution, who were also re-elected.

In acknowledging the compliment, Mr. W. A. Coppinger said a house surgeon was wanted, which would increase their expenses from £50 to £70 per annum. They had received in students' fees last year £75 12s., and, as the balance-sheet showed, they had a little money in hand.

Mr. Alfred Crewdson moved, and Mr. John Norriss seconded, a vote of thank to the Bishop for presiding, which was heartily accorded, and his lordship having replied, the meeting terminated.

APPOINTMENTS.

J. Royston, L.P.S., England, has been appointed Lecturer in Dental Metalurgy to the University College, Liverpool.

Mr. J. Royston, L.D.S., England, has been appointed Dental Surgeon to the Royal Southern Hospital, Liverpool.

British Journal of Dental Science.

No. 436. LONDON, MAR. 15, 1886. Vol. XXIX

PRESIDENT'S ADDRESS.*

By F. Charters White, M.R.C.S., L.D.S.

Gentlemen,--Allow me to thank you for the honourable position in which, by your suffrages, I find myself placed this evening; but while I do this, a sense of inadequacy rises within me when I remember the long list of well-known and highly appreciated predecessors who in the past have occupied this chair. While sensible of my inability to place myself on a level with those who may justly be regarded as the fathers of the profession in England, I claim to stand second to none in love for that special branch of surgery which we practise, and they did so much to advance. In looking back down the long vista of my professional experience it is gratifying to note the advances made to those who, going before, bore the burden and heat of the day; working in comparative isolation, and doing such good work that their names became familiar as household words in the mouths of all who were best qualified to appreciate and judge of it. Their appliances were comparatively crude, and their remedial agents few—it was not for them the barbed nerve extractor, the electro-magnet, and the burring engine with its multifarious bits—yet they triumphantly overcame difficulties which occasioually baffle us now.

It needs not the panegyric of an address like this to sing the praises of those who founded this Society; these live sufficiently in our surroundings.

I well remember the period when their honoured names could well-nigh be counted on the fingers of a man's hand. Their power as individual members of the profession was limited; few opportunities existed for their meeting in a corporate capacity, and discussing matters of professional interest. When once the tide of co-operation set in, that little cloud not bigger than a man's hand foreshadowed a mighty torrent of advancement, whose waves of improvement have not only resulted in the refinement of our surgical appliances, in the advance of our dental therapeutics, and the extension of our means of combating dental disease, but in fostering friendships far and wide, and in a Society like this adding daily to our mutual knowledge. The practitioners of the past, in forming this bond of union between us, laid the foundation for the furtherance of our knowledge—*they* laboured, and *we* have entered into their rest. I should qualify that word rest, as I refuse to accept finality in the path of progress. They kave been, as it were, translated from the scenes of their early labours, and their mantle has fallen upon us ; we are the trustees of that legacy they have left for those who follow, and it remains for us as a Society to fulfil that trust by carrying on the advance they started.

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* An inaugural address delivered before the Odontological Society of Great Britain.

It needs but a transient glance over the records of the Odontological Society to see how that trust has been carried out in the past. The valuable papers brought before us from time to time testify to the watchful interest its members take in all which relates to the practice of their profession, and their anxiety to extend this knowledge to the benefit of their suffering patients. But while there is much cause for congratulation, it is to be regretted that so many abstain through diffidence from coming forward to assist in a more constant supply of communications bearing on topics of general and daily practice. There are many subjects which need further light, and which have by no means received their ultimate illumination. Our newly acquired remedies need further use and observation, and their merits to be, by a species of collective investigation, well threshed out. Many of these remedies come before us with respectable credentials, but they require to be proved. Take our experience of the recently introduced Cocaine and its application to Dental Hygiéne. Judged by the notice we as a Society have given it, and by personal experience, it falls far short of what we had been led to expect from its character as a local anæsthetic serviceable in dental surgery. It is only by our concentrated observation and frequent trials that we can glean from it all that is good, and reject that which is useless to us as a remedial agent.

In my own practice I have only found it truly of service in calming the intense pain which follows the extraction of a highly inflamed tooth ; but others may have experiences of a different character to bring forward, and casual communications embodying such experiences would be very acceptable, and would greatly conduce to our mutual advance.

Again, we have had in late years great additions to the antiseptic remedies employed in dental surgery. These remedies, as is well known to us all, are of great importance in the treatment of exposed pulp. Time was when creasote was about the only antiseptic agent in use for this purpose, but later researches have added to our "*armamentaria*" carbolic acid and its various relations, which I believe is an antiseptic agent not to be superseded. It possesses a capability of penetration into inaccessible sinuses beyond many other much vaunted remedies, and although many surgeons have a fear while they use it in severe operations lest carbolic poisoning should supervene, we use it in such small doses that no dread of mischance attends its employment. Moreover, its peculiar action upon an exposed pulp is favourable in many ways ; the first application condenses the albuminous element of the surface and closes it against the entrance of putrescible germs ; furthermore, it acts as a local anæsthetic on the nerves of the pulp during its destruction by escharotics. These qualifications, in addition to its antiseptic character, constitute it a most valuable addition to our dental therapeutics.

Now while we may be thoroughly satisfied with the results obtained through the instrumentality of this agent, the question still exists, can we find a better ? Another antiseptic agent, the use of which has been lately advocated by Mr John Wood, deserves careful trial at our hands. Being so recently introduced, I have not been able to test its capabilities to the utmost, but coming as the recommendation does from one who bears such a well-deserved reputation for surgical skill and analytical observation, it will doubtless prove of as great utility in our hands as it has in his, while it will be free from many of the objections attached to carbolic acid. Peroxide of hydrogen, according to Mr. John Wood, is one of the most powerful microbicides known. He says in his recent Bradshaw lecture on Antiseptics in Surgery: "So small a proportion as one part in 2,000 is efficacious in preventing the beginnings of putrefactive fermentation, and destroying the activity and propagation of bacteria and micrococci of all kinds. It is absolutetly innocuous, and is quite free from any suspicion of local or constitutional irritation." Such a recommendation, coming from so good an authority, carries with it a strong desire to test its efficacy in the prevention of suppurative action in our treatment of exposed pulp and the cure of alveolar abscess. It is to be hoped this efficacy in dental surgery may be put to the test, and the results made known to us at some future time in a short paper. Antiseptics perform such an important *rôle* in the conservative surgery of the present day that every fresh one recommended to our notice should undergo the severest trial of its merits before being admitted to our fullest confidences, as many such, after having been weighed in the balance of our experience, have been found sadly wanting. I feel strongly disposed to say that this peroxide of hydrogen will justify our expectations, and not be relegated to that limbo to which so many other much praised antiseptics have been consigned at last.

I would again suggest another subject to which our united and concentrated attention might be directed with a view to the elucidation of its cause and treatment. I mean that obscure disease, erosion of the teeth, or, as Hunter called it, "decay by denudation." We meet with it in practice almost as frequently as we do caries, but while we can by stopping a tooth arrest caries and save that tooth, erosion on the other hand goes on with a determination we can do little to check. Many theories have been advanced in explanation of its cause, but none upon which to found a firm basis for treatment. My own conviction on the subject, coupled with the patients themselves, leads me to infer that a gouty or rheumatic diathesis lies at the foundation of this disease—that the acid engendered in the system, exuding from the gums, attacks those parts of the teeth immediately contiguous and in combination with the friction of tongue, lips, and food, removes an infinitesimal portion every day. This opinion is strengthened by the small quantity of tartar coating the teeth in the neighbourhood of the erosions, and by the reddening of blue litmus paper placed in contact with the gums of the eroded teeth; but this is only a suggestion on my part as to the cause. I think it is a subject worthy of united consideration, for in erosion we have a disease which up to the present time seems to defy all our powers of observation and treatment, and might therefore fitly furnish a subject for collective investigation by which we might obtain data for the elucidation of its cause, and upon which we might ground its successful treatment.

I am not aware of anything approaching original investigation having been of recent years devoted to this disease, nor anything so full and complete as the *résumé* of it given by our old and valued though absent friend, Mr. Alfred Coleman, before the International Medical Congress in 1881, and to which I would direct your attention.

There are also many other obscure points in dental pathology to which attention might be directed with advantage to us all, and one is the cause of that premature decay of the first permanent molars, common amongst children during the past forty years or so, and for which parents generally and anxiously require an explanation.

From occasional microscopical examination of such of these teeth as I have removed in an early stage of decay, I am inclined to attribute one cause of it to an apparent want of fusion between the advancing centres of calcification of the enamel, an arrest of development leaving pipe-like fissures in the masticating surfaces, which become foci of chemical action from the fermentation of food squeezed into them. But in addition to this malformation there is an appearance of general weakness in such teeth, which can only be accounted for on the hypothesis of some disturbing influence during an early period in the life of the child interfering with the normal development of this particular tooth, sometimes in conjunction with that of the incisor teeth; but as this peculiar disturbing influence affects the majority of the children who come under our notice, it becomes very desirable that we should investigate its history, and if possible trace the evil to its source.

But I need not occupy the time of this meeting by multiplying these suggestions towards further investigations. I can only state that as former occupants of this chair have always stretched out a warm hand of welcome to any of the members of this Society who have come forward to give us the benefit of their experience, this year shall not form an exception. We have from time to time received valuable information from many outside the boundaries of our speciality, and while we have been deeply absorbed in listening to their interesting and instructive papers, we have been precluded from taking any active part in the discussion of them by reason of their subjects not coming within the scope of our daily experience. Such communications will always receive that attention their high merits deserve, and their authors will always be thankfully appreciated, but we feel that more papers should come from within our ranks. We number amongst us men of high educational attainments, and we are justified in expecting from them, if they strictly fulfil their mission as members of a Society, a fair contribution now and again as the result of their thoughtful investigations, and bearing as these would probably do on the work of our daily lives, they would be discussed, not to our benefit alone, but for that also of those who seek our professional aid. I leave the consideration of these suggestions to the willing hands and hearts of our younger brethren in this Society—to those who have the energy and vigour and probably the leisure of youth. The greatest advances in a state may be confidently looked for in that *via media* between the vigorous impulse of youth and the mature restraint of age, and our younger brethren may confidently reply upon being listened to by their elders here with that attentive interest which has always been evinced in the subjects so brought before them, and in the subsequent discussion the mature judgment of older practitioners will correct where necessary, but not with unkindness. It does not speak well for any Society where the burden of finding a supply of communications is thrown upon the executive and where the members are content to play the *rôle* of lay figures to make up an audience, and I sincerely hope that that diffidence which is so closely associated with this state of affairs may be dissipated as dew before the rising day, and that those who now retire behind this cloud may emerge to aid us in our desire to still further advance the scientific boundaries of our professional practice. Before resuming my seat, let me again thank you for the honour you have done me in electing me to the dignity of being your President for the coming year.

VOTE OF THANKS.

Mr. Thos. Underwood proposed a vote of thanks to the President for his very suggestive address. As originally founded, the Society was intended to serve both political and scientific purposes. Its political work had been to a great extent accomplished, but as regards the scientific aspect the work before it was, as the President had pointed out, as interesting and as valuable as ever. Such being now the main object of the Society, it was a pleasure to see it presided over by one eminent in the scientific world, especially in connection with microscopical science, and he looked forward to a prosperous year under Mr. White's guidance.

Mr. Robert Hepburn seconded the motion, which was carried with much applause.

The President expressed his thanks, adding that he had found it rather a difficult matter to write an address. So many of the subjects he would have liked to have touched upon had been treated of by his predecessors that the ground seemed at first to have been completely cut away.

He then announced that at the meeting on March 1st Dr. Dudley Buxton would read a paper on the "Physiological Action of Nitrous Oxide." The April meeting would be devoted entirely to Casual Communications, which were frequently quite as interesting and instructive as a formal paper. Amongst these would be one by Dr. Walker on "Continuous Gum Work," with reference to the remarks on that subject made by Dr. Cunningham at the last meeting.

The Society then adjourned.

DEATH FROM CARIES AND DENTAL PERIOSTITIS.

A CLINICAL LECTURE,

By M. Poucet, of the Val-de-Grace Hospital.

In a communication read before the Société de Chirurgie, M. Poucet related and demonstrated microscopic preparations of a fatal case of caries and dental periostitis.

The patient, a man of forty-six, a non-commissioned officer in the grade républicaine, who had been over fatigued and was addicted to habits of intemperance, entered the hospital ten days after the beginning of the illness. He had a large dental swelling, which did not fluctuate at the angle of the jaw, and when he arrived he already presented all the appearances of a patient with septicæmia.

The next day, it was noted that he had an extensive tract of soft œdema over the whole of the outer surface of both fore arms ; on the right side there were in addition, some large bullæ filled with pale lemon coloured serum.

The patient died forty-eight hours afterwards. The post mortem examination revealed the existence of small lenticular abscesses along the right half of the maxilla, and the upper half of the sterno-mastoid.

The œdema of the fore arms was situated over the aponeurosis and had become changed into a purulent mass in the cellular fatty meshes. The spleen was softened into a pulpy mass, and the liver cirrhosed and fatty. The right neutricle contained large clots.

In the descriptions of purulent or putred septicæmia no mention is found of serious œdema of the fore arms : in this case we had not to deal with metastatie abscesses or any form of erysipelas, nor malignant œdema as there was no induration.

These metastatic œdematous foci contained vast numbers of micrococci ; they were made up almost entirely of swarms of micrococci amongst the white globules as is so well shown in the microscopic preparations.

M. Poncet found perfect colonies of these micrococci in the clots in the heart. The clot having formed anti mortem, the microbes had had time to form pure cultures, the extent of which exceeded one-tenth of a millimetre. In a section a centimetre square there were as many as thirty colonies. They presented the appearance of leptothrix and the colonies in the midst of the fibrine consisted mainly of these long strings of micrococci interwoven in every possible manner.

To sum up, this patient died from putrid microbian infection starting from caries of a tooth.

This form of œdema which is not described in any standard treatise, is of a very gave proguosis and it ought to be placed next to the metastatic abscesses of purulent resorption.

This abscesses consist of masses of micrococci which are in a much more advanced stage of development in the clots in the heart.

DENTAL AND ORAL CASES IN ANIMALS.*

By J. Bland Sutton, F.R.C.S.

Erasmus Wilson Lecturer on Pathology, Royal College of Surgeons; Lecturer on Comparative Anatomy, and Assistant-Surgeon to the Middlesex Hospital.

The object of the present communication is to bring under the notice of the Society a few examples of abnormalities and diseases of the teeth and mouth occurring in animals, and to offer a few remarks on some conclusions a study of the specimens suggests.

Growths.—Morbid growths in animals are not very common; tumours of the orals cavity other than those caused by parasites are still rarer.

An interesting example occurred in an adult tiger, of fibrous epulides connected with the gums of the lower jaw. There were in all eight of these fibrous masses. It is closely associated with a tooth which has been imperfectly erupted, and its pedicle is intimately attached to the alveolo-dental periosteum. Microscopically they seem to be overgrowths of the mucous membrane, with a large amount of exceedingly dense and tough fibrous tissue.

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* A paper read before the Odontological Society of Great Britain.

The general condition of the animal's teeth was very unsatisfactory, many of them being irregular in position, and some had their crowns partially embedded in the mucous membrane.

Epulis is a well-recognised affection in the horse, but in addition to the tiger, I have only seen one other example in wild animals, and that was in a wolf.

The next case is of some interest in its bearing on the relation of irritation and tumour formation.

The drawings represent a young sheep's nose surrounded by simple warts, agreeing in structure with those occuring on the hands of children. The second drawing shows the hard palate, with numerous warts sprouting from the ridges normally seen on the roof of the mouth of ruminants. A more critical examination shows that these warts are really overgrown papillæ of which these transverse ridges are composed. In the same way numerous warts existed on the dorsum of the tongue, most of which were in connection with the lingual papillæ and the buccal fringes.

In addition to this condition of the mouth, there was a crop of exactly similar warts immediately above the hoof, at the spot known as the coronet.

The causation of these papillomata is somewhat curious. In this country farmers are in the habit of sowing clover among wheat soon after the young blade has made its appearance. When the time arrives for cutting the corn, the clover is low and out of harm. The wheat is removed, and allows the clover to grow, but the stubble remains. When sheep are turned on these clover fields they have to submit themselves, at least their noses and feet, to the constant irritation of the hard ends of the stubble. In many cases a crop of warts on the nose, mouth, and coronet is the consequence.

This condition is not by any means rare, for I have heard of as many as fifty in a large flock presenting these papillomata. If the affected sheep be removed from the stubble their warts disappear.

Lambs' noses, like the hands of children, are very prone to develop warts, in consequence of their fondness for sticking them in dirty places.

Osteo-dentine.—It has been remarked by more than one writer on dental subjects that it is impossible to draw any sharp line of demarcation between the varieties of dentine, for they pass by insensible gradations one into the other, and it is often difficult to distinguish between some of the varieties and bone.

It is more especially to osteo-dentine that I wish to draw attention.

This substance is usually defined as dentine containing vascular canals with a matrix disposed concentrically around them : lacunæ may be detected among the tubules.

So far as human teeth are concerned, osteo-dentine usually occurs as a pathological formation ; but in many animals, the walrus, cetacea, and others, it is found occupying the pulp chamber under conditions not usually regarded as pathological.

It seems to me that the bare fact of the existence of osteo-dentine as a constituent of teeth, under certain conditions, is really the only reason for classing this material with dentine. Between bone and dentine a very wide distinction exists. Dentine being a hard tissue pervaded in a regular manner by a system of tubules, containing fibrils of soft material. The dentine itself is the result of the activity of a layer of cells lining the pulp chamber and known as odontoblasts.

Bone, in its typical form, may be defined as a hard tissue permeated by vascular canals (Haversian) surrounded by lamellæ, containing in their midst numerous lacunæ which communicate with each other by means of canaliculi. The hard part of the tissue results from the activity of living cells known as osteoblasts. But bone may arise in other ways, and by one method which, in connection with the subject in hand, is of some importance. It not infrequently happens that tracts of osseous tissue are met with in inflammatory formations, and in new growths such as osteo-sarcomata, in which it is easy to determine that we have to deal with a deposit of granular calcareous matter in a homogeneous matrix. If the deposit is large and of long standing, the presence of lacunæ and canaliculi may be determined. A very common situation for the existence of such deposits is the choroid coat of old disused eyes.

If any one takes the trouble to compare under the microscope thin sections of bone from this situation with a piece of osteo-dentine, he will be unable to distinguish the one from the other.

Admitting the histological identity of the two tissues when fully formed, it becomes necessary to determine whether the mode of development in the two cases is identical.

I have been able to follow the matter with considerable detail in the following cases.

A young capybara came into my hands, and on examining its teeth I was surprised to find that the layers of cementum, which normally bind together the plates of its compound molars, had softened to such a degree that the various parts could be separated like the leaves of a book; in this condition it presented layers of enamel and dentine of the ordinary density, succeeded by a layer of tissue resembling tough leather; microscopical examination showed this soft tissue to be really decalcified cementum. On examining the molars carefully it was clear that one had to deal with normally formed cementum which had become decalcified, and not tissue in which the calcification had been arrested. The incisors were so soft in the parts below the gums that it was possible to mark them with one's finger-nail. On breaking them across they presented a curious porous, almost spongy, condition The maxillæ seemed fairly normal, but the other parts of the skeleton bore evidence of disease, the knee-joints were affected with pulpy degeneration of the synovial membrane, and the body generally bore abundant evidence of malnutrition. Pieces of the incisors were slowly decalcified in a mixture of chromic and nitric acids, cut in sections, and stained in various ways. When examined under the microscope osteo-dentine could be seen in various stages of development. The first thing to arrest attention in these specimens was the strong evidence afforded by the hæmatoxylin that many of the appearances were the result of inflammation. If sections of tissues which have been inflamed be stained with this material the inflamed portions stain more deeply and quickly than the normal tissue, hence it acts as an agent of differentiation. On examining sections of the capybara's teeth, islands and peninsulas of inflammatory tissue everywhere meet the eye, and dotted in them, in a way resembling cartilage cells, are tiny refractive calcareous granules. Beyond these patches of exudation the ordinary connective tissue of the pulp is seen. On examining a series of sections it was possible to trace the various stages from the normal connective tissue to patches homogeneoes from exudation, to others sparkling with rounded refractive calcareous granules, and finally to others in which lacunæ and canaliculi could be discerned.

On comparing sections of so-called osteo-dentine with sections of bone from inflammatory new formations, I find it impossible to distinguish between them. This had led me to the conclusion that osteo-dentine is the result of ossification of the connective tissue of the pulp of the teeth: in very many cases this may be preceded by inflammation, but that event is by no means essential. Further, osteo-dentine is more closely allied to cementum than to dentine, from which it differs not only histologically, but also in the manner of its development.

If this view be correct, then osteo-dentine must be regarded as an imperfect variety of bone, originating in membrane, and in no sense allied to dentine. This opinion is supported by the circumstance that in the teeth of Odontocetes, Walrus, &c., we have no evidence of inflammation, yet osteo-dentine is present in great abundance.

(*To be Continued*).

DISCUSSION UPON THE TREATMENT OF THE TEETH OF CHILDREN.*

Mr. Macgregor said—This being a night set apart for discussion, and a proposal having been made at the last meeting of our Society that it should be on the treatment of children's teeth up to the age of 12 ; at the request of our President, I agreed to open the discussion. With that object I have jotted down a few remarks.

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* This discussion took place before the Odonto-Chirurgical Society of Scotland.

I think the subject selected for to-night is a most important one, bearing, as it does, upon the health and happiness of the young. We all know, from sad experience, the amount of suffering the little ones who are brought to us endure, even at the earliest age, from the ravages of decay in their young and imperfectly formed teeth, and how incumbent it is for the dental surgeon to mitigate that as much as possible.

We are seldom called upon to treat the teeth of very young children, as that comes more within the province of the general medical practitioner. At the age of four or five, however, when caries has begun to appear, the young patients begin to make their appearance in our surgeries, calling aloud for us to give relief to their sufferings. Alas ! how little can we often do, when even to look at the offending tooth is often sufficient to make them scream with terror.

The teeth which usually first begin to show signs of decay, are the molars ; they are, at least, those which give most trouble to the young patient, and which we are called upon to treat and, if possible, save. We all know how difficult it is for the young patients to allow the dentist even to look at the offending tooth, far less to be allowed to apply remedies to mitigate their sufferings, and afterwards try to save it till shed.

The remedies in that case must often be of a very temporary nature, mainly to give relief, and, in many instances, must be applied by the parents of the child. In superficial decay, when teeth cannot be stopped, Mr. Coleman advocates the application of a few drops of a mixture of sal volatile and alcohol after each meal of the decayed tooth, which, he considers, has often powers of arresting the decay until the teeth are shed. When we have caries in the crowns of molars, and can get the patient to submit to an operation, we can preserve the teeth with an amalgam stopping, so as not likely to give further trouble. In interstitial decay, however, and when the pulp is exposed, we, to a great extent, must temporise, dressing with carbolic acid, carbolised resin, and other remedies. When the tooth has been brought to a condition to admit of a stopping, one of Hill's, or one of the cements, may be inserted so as to give relief for a time. We must always remember the importance of retaining the temporary teeth as long as possible. A good thing to do when the young patients are brought to us is to impress on the parents the importance of thorough cleanliness in their children's teeth, and use the tooth brush at least every day. What is of still greater importance is the proper attention to diet and exercise. Many of the parents at the present day have given over the good old custom of giving porridge and milk to their children and substituted tea instead, not to the advantage of the teeth, by any means.

The next teeth we are called upon to attend to are those which have caused more controversy in the profession than any of the others—namely, the six year old molars. What are we to do with them? We often find them constitutionally so weak that, no sooner are they erupted than they show signs of decay.

Those teeth are often considerably decayed before the patient is brought to us, often from the mistaken belief of parents that they are temporary teeth, and that they will get new ones in their place. When it is at all possible to save them, I consider it advisable to do so, as we often find that when they are much decayed, the temporary molars are in much the same condition. And when that is the case, I consider it essential to retain them until, at least, about the period of the eruption of the twelve-year-old molars, when we may consider the advisability of extracting them.

The stopping I find most suitable for the six-year-old molars, when the pulp is not exposed, is one of the copper amalgams. The chemical action, resulting from their use, has a preservative effect on the action of the teeth, and tends to arrest decay; and we often find that where it has been used, the tooth has been left in a very satisfactory condition for many years. When the pulps are exposed, we can, by judicious treatment, put them in a condition to be stopped with one of the cements, and so retain them as useful factors for mastication.

I now pass on to the incisor teeth. They are those which will require all our skill to save. Decay may have extended in them to a very considerable extent before the patient is brought to us; and especially so when there has been no systematic inspection. What are we to do to save them If is often out of the question to attempt to insert a permanent stopping in them at that early age, all we can do is to put in a filling, which will preserve the teeth until the age of 16 or so, when we can insert gold, or an amalgam if the patient is not in a position to pay for the more expensive stopping.

We often find the oral fluid, when in a vitiated condition, a most destructive agent in decay of the teeth, and when such is the case we must prescribe an alkaline mouth wash and tooth powder to try and counteract its action. The temporary stoppings I find most serviceable in the incisor teeth, in interstitial decay, is either Jacob's gutta-percha or Weston's cement. These, used with care, will serve to arrest decay for a few years, until the patient is old enough to submit to a more permanent operation.

The bicuspids will now very likely require our attention. Where there is only a deep fissure upon the grinding surface, without any exposure of the pulp, they can be saved for many years with either soft gold foil, or tin; where interstitial decay existed, the same treatment will hold good as suggested for the incisors.

Lastly, we have to consider the irregularity of the teeth. I will only touch on those cases where it can be prevented by the use of the forceps.

When the permanent teeth are making their appearance in the front of the mouth, and we are required to remove some of the temporary incisor teeth, which are still in opposition, it is necessary to remember the importance of retaining the temporary canine teeth as long as possible, as irreparable mischief is often caused by their premature extraction, the laterals and biscuspids, in that case, often being in position before the appearance of the permanent canines. In such an instance as this, and if all the teeth are in a sound condition, the extraction of the first bicuspid will allow the canine tooth to drop into the space thus gained, and so prevent what would otherwise have been both a deformity, and also a source of decay in the other teeth, from lateral pressure.

(*To be continued.*)

VALEDICTORY ADDRESS.

BY C. SPENCE BATE, F.R.S.

(Concluded from page 195.)

Now if we turn to another source of examination, we shall find a similar supply of material under other and separate conditions.

On the surface of an artificial substitute that has been worn in the mouth of a person who has not taken any remarkable degree of care of the same, we shall observe that at certain spots an accumulation of material takes place; if this be removed a more or less adhesive condition is found to exist between the material there lodged and the plate on which it rests. If the former be removed it will comenee to grow again, and this takes place either on gold or vulcanite, and it produces a mark on the surface of the plate. It commences generally in small round spots which gradually enlarge in height and diameter.

Microscopic examination of these several spots shows their resemblance to the deposits formed within the gingival pockets at the base of the teeth. This, I think, clearly demonstrates that both these conditions are obtained from an external source, and that in both it is the same. Although not in the same active condition, they exhibit the stationary rods and active and wandering bacilli and micrococci mixed with them.

Although the presence of these fungus germs may be the active agent of the inflammatory state that induces the absorption of the alveolar margins, yet the early conditions which enable these foreign bodies to establish themselves and thrive must be looked for in a more distant stage, and have relation to the constitutional character of the tissues. I must ask now those who follow me to accept for the present the conclusiveness of my observations, and if their experience hitherto does not induce them to accept mine at once, that they will be good enough to defer their judgment until they have had time to compare my conclusions with their own opinions before arriving at a distinct theory on the subject.

I believe that lateral compression is the predisposing cause of that distressing condition that leads to the waste of the alveolar processes. The jaws not being large enough to allow the teeth to range themselves in their normal position the teeth stand crushed together in almost every form of irregularity, some within and some without, and others elevated above or depressed beneath the normal line of the dental arch.

One of the commonest and most prevailing instances may be frequently observed in the lower front teeth. The lower jaw being small, the canines, the strong fronto-lateral buttresses of the jaw, are situated too near each other to allow the four incisors to stand in the normal arch between them ; the consequence is that pressure forces the incisors above the level of their correct position and ranges them like a fan, spreading from a common centre. If they do not rise above the level of the others, it is because they have been forced out or in beyond their normal line ; in either case the tooth becomes marked for an early attack that ends in its becoming loose and falling out.

I do not think that I can illustrate better the cause and progress of the disease than by recording the history of a mouth in which several sound and healthy teeth can be traced to have loosened and been lost as a direct consequence of lateral pressure.

The mouth to which I refer I have had the opportunity of a more or less constant revision for many years. The teeth were sound, healthy, and strong. Three or four were plugged with gold in their buccal and coronal surfaces, but the stoppings were small and protective rather than restorative.

The teeth were all regularly developed in an even arch excepting the right upper central incisor, which had to be turned by mechanical contrivance. This state of things continued until the third lower molars appeared, and then a change came on that may best be understood by the following account.

The lower wisdom teeth were cut when the patient alluded to was twenty-two years of age ; the first came through with much distress and some pain, which latter was felt chiefly between the second bicuspid and the molars on the same side.

My advice was—and I much regret that it was from some cause not carried out—the removal of the newly developed tooth.

The pain between the above-mentioned teeth, though not severe, was frequent, and often present for many days at a time, and latterly in connection with a similar distress corresponding in position with the first bicuspid on the same side.

These pains were evidently between the teeth and not in them, as the teeth were not tender to the touch ; but the inter-dental gingival processes were sensitive and suffered distress from the presence of food, and the teeth generally were tender to mastication.

A year or two after the wisdom tooth on the right side came into position, that on the left followed with more local and immediate, but with less general and continuous disturbance.

With this latter tooth a phagedenic ulcer spread over the inside of right cheek, palate and fauces, and for several days the erysipelatous symptoms were severe and acute, and were chiefly reduced by a lotion of the bichlorate of potash.

When this condition of things subsided, the mouth for a time was apparently well ; but whenever there was any gastric disturbance the gums became irritated and the teeth tender in biting, and occasionally the disturbance would increase to a distressing degree.

The gentleman not consenting to have the wisdom teeth removed, I remember passing a file between the first molar and second bicuspid teeth on the right side—(I am writing of forty years ago)—and procured for my friend a relief that was decided in degree and permanent in its durability.

Time, however, obliterated the space cut between the teeth, and although the disturbing pain never returned to the same extent, a new and different condition of things arose. The wisdom teeth came better into place, but it was found that the upper incisor teeth were being projected forward by the pressure of the lower incisors against them, causing teeth that were once in close contact to be forced apart to a considerable extent. At the same time the gums corresponding with the position of the lower incisors exhibited evidence of becoming thickened and disturbed.

It now began to settle on my friend's mind that it would have been better had the wisdom teeth been removed earlier.

This was now done, and for several years all trouble disappeared; the teeth were strong and healthy, and with the exception of the second bicuspid on the right side that had been filled, no symptom of decay was visible.

It will be remembered that the chief distress fell on the molar teeth of the lower jaw and between the bicuspid and canine on the right side. Now the history culminates in this point, that all the teeth that suffered most from lateral compression became loose and fell out. The alveolar processes corresponding with the second molars, and the inner and outer alveolar walls of the first molar on the right side, wasted away, as well as the outer wall of the bicuspid alveolus.

I think any one who has followed me will agree that had the wisdom teeth been removed when it was first proposed, much of the later condition of things would have been arrested, and I think that we are justified in tracing, as cause and effect, the loss of these teeth to the action set up by the presence of teeth in a jaw too small to retain them without considerable lateral pressure.

If we follow up this by observations under other and different conditions, we shall remember how in the irregular position common to the lower incisor teeth we see one tooth forced outward and another too far back, how the too advanced teeth lose their hold on the adjoining tissues through the absorption of the alveolar walls, and how, on the other hand, a large fold of the gingival margin fills up the hollows caused by the retiring teeth, and forms pockets into which the saliva penetrates, holding in solution calcareous salts and fungoid germs.

The tartar never deposits on soft and living tissue, but rests only on the hard and fixed structure of the teeth, following closely on the separation of their vascular attachment. These fungoid germs, which we recognise under the names of

Micrococci and Bacilli, induce an active local inflammatory condition of the gums that is followed by the absorption of the alveolar processes, the wasting of which removes from the teeth that support which their presence gives. The teeth become loose, and in a short time become useless as masticatory organs and fall out. That we may be able to know and trace the pathology of the disease is to enable us to arrive at a correct method of treatment upon a scientific basis.

At present our treatment is empirical, and therefore only remedial. We may scrape the salivary calculus from the teeth, sponge and syringe the softer tissues with any specific we like, but we only reduce the action and do not remove the source of the disease.

No doubt but that topical treatment does relieve trouble and reduce the activity of the disease, and when thoroughly carried out with the cordial support of the patient, the value of the teeth may be retained as useful organs fulfilling their capacity for some time longer.

The true origin of this disease is to be found in the great lateral pressure that is induced by the teeth being larger in proportion than the space in which they are arranged, which is, I believe, the beginning of those conditions which enable the germs of the disease to take root.

In a young person we find the vascular folds of the gum often very conspicuous, a condition that is not present when the teeth are duly spaced. If I am correct in this belief, our treatment must be preventive rather than curative, and in those mouths in which it is more desirable that the teeth should be useful than ornamental, it is important that undue crowding of the teeth should not be permitted.

Thus in the treatment of the teeth in the class from which our military and naval forces, as well as the industrial occupations generally, are recruited, it is the duty of those who have the management of the same rather to secure a healthy denture than to seek to retain those teeth that are conventionally ornamental; and if in any situation in life it is desirable that none should attain a footing in it without a normally good set of teeth, it is still more important that such individuals should have their teeth under regular supervision during the time that the dentinal tissues are becoming consolidated and are less liable to resist conditions that are injurious to them.

If a boy enters the navy at fourteen years of age with a model denture in form and healthiness, it by no means follows that the teeth will retain those conditions if treated with neglect. It therefore appears to me that it is as important that the mouths of the boys that enter the navy should have that supervision which is necessary for their permanent healthiness, as it is necessary to fix an abitrary rule prior to their entering the sorvice as to the number of teeth they may possess.

The question arises, how is this supervision to be attained ? I can only suppose that if it be an important feature in a sailor's life that he should possess a good set of teeth, then it is desirable that the medical staff of that service should be educated in the knowledge of the organs, and it should be their duty to attend to them. And we might suppose that on board a ship of war, where there may be five hundred to a thousand men, the L.D.S. Diploma of the Royal College of Surgeons would be of greater practical value than the Midwifery Diploma of the same College, yet the latter is, I believe, a compulsory qualification.

Nothing can conduce more to the risk of a ship, or the loss of an important strategic position, than a sailor in a night watch, or a soldier on guard, suffering from the most acute of known pains, such as is producible from diseased state of the teeth.

And when we consider the importance that the wealthy attach to their teeth, the large amount of money and time that they bestow on them, I think that we may give a thought to our poorer fellows who have to bear the brunt of storms and wars, and urge that those who are trained to look after their general health shall be educated to treat the teeth as much as the other organs of the body ; and I feel assured that it will be found that many of the neuralgic pains more or less immediately connected with the teeth, and the dyspeptic condition of many a man, would disappear if the naval and military surgeons had the Diploma of Dental Surgrey as well as that of Midwifery.

In the early portion of this address I said that the Odontological Society had done much good in bringing together the members of the profession ; but I think that more might be done.

To know a great or a good man is to follow and emulate him. To know personally those of our profession whom we acknowledge as being greater than ourselves is to try to be nearer to them.

For this purpose members come to this Society and listen to communications of educational interest and practical value. But many who come from a distance listen to what has been read, and that which has been brought out in discussion, and they see many of whom they have heard ;—the meeting breaks up and they return home with an increase of information, but with a feeling of disappointment ; for those to whose acquaintance they had aspired may have brushed them with their coat as they passed, but still to them they are only as brilliant lights, while they are still in the shadow.

If once in the course of the year, when the season is bright, and London is pleasant, the Society were to have a reunion or conversazione, where the members might select and ride his own peculiar hobby, the members would learn by a knowledge of each other to respect and appreciate each other, and in my humble opinion the Society would increase in numbers by bringing from the more distant parts of the country those who desire not to be lost in the isolation of obscurity.

Before closing these few remarks I should like to express my indebtedness to the Council for being so lenient to my shortcomings, and to the two Secretaries, Mr. R. Woodhouse and Mr. D. Hepburn, for their obliging attention in overcoming difficulties that would have arisen but for their experience and attention.

Reflections from the Surgery.

A CASE IN PRACTICE

(Under the care of GEORGE PEDLEY, London).

Six months ago a young lady, aged 27, called, being in trouble at the loss of the right upper wisdom tooth (she had sometime before lost the two molars in front of it).

On the previous day while sufferering severe pain she consulted a surgeon who extracted the tooth which proved to be quite sound, and her object in calling was to know if it could not be replaced.

The tooth was put in warm water for a few minutes and after the cavity had been carefully cleansed with a wisp of wet cotton wool, the tooth was replaced, to effect which required considerable force.

Three months later the lady came to report that the gum was rather sore for about a week, but was then quite comfortable, and the tooth as serviceable for mastication purposes as before, after twenty-four hours sojourn in its socket.

British Journal of Dental Science.

LONDON, MARCH 15, 1886.

GENERAL MALNUTRITION AND THE TEETH.

The most difficult class of diseases to cure are said by medical men to be "slight ailments." Nothing much the matter but something constantly amiss. The persons who are the subjects of these slight ailments are frequent visitors to the dental operating room, indeed they are seldom free from dental trouble and so are really never off the books of their dental attendant. To the thoughtful mind these cases present many points of great interest, and present many enigmas by no means easy of solution. It is not enough for us to say, "Oh, so-and-so has bad teeth. I have overhauled the whole denture, and have renewed and renovated, and now all is right for the present." So-and-So's mouth is a scientific problem crying for some explanation, waiting to be worked out. Although the teeth among this type of men, women, and children are zealously and carefully tended, they are nearly always what may be called *unsatisfactory*. The work is well done, but the results arrived at are bad and quite out of proportion to the labour expended. You will hear their friends say, it is no good sending him or her, as the case may be, to the dentist, the teeth always get bad again. To explain such cases one has to tackle many of the most intricate problems of pathology. Nutrition becomes perverted in very many ways and as nineteenth-century developments spread a pace those ways get multiplied. Overpressure in work or over close attention to social duties ; balls, routs, rich innutritious dietary, late hours, luxurious housing and feeding, all tend to induce malnutrition. Town dwelling children and immigrants to towns from country districts soon fall victims to this depreciating nutrition. It would not be profitable to enter into the *modus operandi* by which these deleterions environments promote malnutrition ; suffice it to point out how far these conditions affect the teeth, and so are carried into the field of practical dentistry. It is most important to recognise these changes early, and to arrive at more than a mere *ad interim* diagnosis, because early treatment can alone prove of real service, if delayed we may restore the health but we shall never bring back the teeth once given over to the ravages of disease. As in starvation, the higher tissues seem protected at the expense of the less highly organised materials, so in this stealthy mode of starvation, none the less sure because it is slow, the tissues are destroyed in the same sequence. We are taught by physiologists that there is a constant splitting up of the molecules of which the body is composed. This breaking up is accompanied, when the patient is in health, by a corresponding building up of tissue from the food after assimilation. For example. The bones lose their phosphate of lime, to which they owe their solidity, the salt passes into the blood stream and is thence eliminated by the kidneys. The brain also loses phosphorus. Now the food should if appropriate and duly assimilated supply an abundance of phosphate ample indeed to bear the strain imposed upon the phosphorus resources of the body. But, however, as soon as the food ceases to contain the due quantity of phosphorus, or the patient is unable from dyspepsia to digest and assimilate the phosphorus containing foods, a phosphorus famine begins, and the body commences to feed upon itself and steadily consumes all its own tissues which contain the required material. This example will serve to illustrate how a general malnutrition can react upon any specified system of the organism, and by abducting from it its constituent salts, albumens, or what not, lessen its resistive power to disease. When these brief hints are fully taken in, it will appear that the teeth are organs peculiarly liable to suffer from this general malnutrition, *plethoric* starvation, if we may be permitted the expression. Whatever may be the true exciting cause of dental caries we need not wait to enquire, but it is clear that granting such an active cause exists it is evident that the chronic starvation of the tissues at large will react upon the teeth in particular, and by lowering their vitality and robbing them of much of their reserve store of materials will render them in a state already primmed to give that exciting cause—a prepared *nidus* wherein to establish morbid processes. The mere fact of the slow and late development of the teeth make their nutrition of the most paramount importance, lessen it and they readily fall the prey to any exciting cause of disease which is lurking in the mouth or body juices. To sum up briefly we may say that in the early stages chronic malnutrition may be checked, and either the dentist or the physician he calls in may do much to check or stop the advance of the enemy. If the case is overlooked, it goes hard before a cure is effected, if indeed a cure ever is achieved.

DINNER OF THE PAST AND PRESENT STUDENTS OF THE DENTAL HOSPITAL OF LONDON.—The dinner which we had the pleasure to announce in our columns was duly carried out on Saturday, Feb. 27th. The number present showed an increase upon previous years. The arrangements were admirably carried out, and after a few speeches which by, the good sense of the Chairman, Mr.

Braine, were made as brief as possible, a truly enjoyable concert was performed by the skilled performers. Whatever may be said against us it can hardly be alledged that our ranks are deficient in men who have devoted their energies with success to music and the fine arts.

Her Majesty has consented to lay the foundation stone of the new Examination Hall of the College of Surgeons and Physicians of London.

Abstracts of British & Foreign Journals.

DENTAL COSMOS.

THE RUBBER DAM.

By Dr. A. H. Brockway.

A paper read before the New York Odontological Society. The writer commences by calling attention to the great importance of keeping cavities dry; all methods of so doing are unsatisfactory alike to operator and patient in many cases. But the rubber dam overcame all or nearly all the difficulties and perplexities. This device, simple as it is, has been one of the most important and valuable contributions to operative dentistry that have thus been made.

The proper use of the rubber dam needs some expertness and care.

A good quality of sheet-rubber of medium thickness is needed preferably of dark colour; punches of at least three sizes, for making the holes; suitable clamps and holders, with which to retain the rubber in position, and, most important of all, an assistant is required. The last, the writer holds should always be found in the office.

Whitened rubber loses elasticity and gives the teeth a blurred appearance. To make the holes in the dam. Nothing simpler or better has been found than a hollow steel punch.

A clamp should be selected as will hold the rubber well away from the tooth without needlessly pressing upon the gum; often one having a little lug upon the jaw, to preven it from slipping down upon the neck of the tooth, will be found very serviceable.

To illustrate the method of applying the dam, it is supposed the operations are to be made upon the second and third molars of the lower jaw, left side. The first step should be to carefully pass a bit of waxed floss-silk between not only those teeth but also all those anterior to them, around to the right inferior cuspid, noting and removing any accumulations of tartar. Observe the relative positions of the teeth, whether any be greatly out of line, or if there be unusual space between them, so as to allow for these peculiarities in making the holes in the dam. Selecting a piece of rubber about eight by ten inches in size, spread it out and punch the hole for the third molar some three or four inches from the upper and least two inches from the right-hand edge of the piece,—punching in succession the holes for the remaining teeth around to and including the incisors; using the largest size punch for the molars, the second size for the bicuspids and cuspid, and the smallest for the incisors. It will be noticed that in normal cases this will provide for inclosing ten teeth, and the objection will perhaps be made that this is unnecessary and will take needless time.

Having made ready the dam, the under-surface in the line of the holes should be touched with a bit of wetted soap, which will greatly facilitate its adjustment, and the operator, taking his position nearly behind and a little above the patient, should slip the rubber first over the right lateral incisos, and in succession over all the other teeth, being assisted in this by the attendant with waxed floss-silk. Reaching and inclosing the third molar, the operator should hold the dam in position while the assistant slips over the tooth a proper clamp. The three edges of the rubber should now be drawn and held back from the corners of the mouth by a suitable holder, and any loose edge likely to interfere with a good view of the work should be fastened down with a small weight. Where it is necessary to expose the neck of a tooth, a ligature of waxed floss-silk should be tied around it, and to the free ends a weight attached. If the ligature be tied with a surgeon's knot, it will retain its place. Should the rubber be inclined to slip from any of the teeth, a better way to prevent it than to ligaturo, as described above, is to tie a small piece of punk to the end of a ligature and draw it between the teeth at the point needed. Still another way is to warm a piece of wax, or a mixture of wax and gum damar, and press it against the teeth so as to make it stick, thus holding the rubber ; care being taken to ha e the teeth to which it is applied quite dry. This preparation is also very useful for stopping any puncture that may accidentally be made in the dam.

To remove the dam wet the exposed and dried teeth with mild soap-suds, slightly warmed ; the rubber will then slip from its place without an effort.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

THE ÆSTHETIC APPLICATION OF DENTAL ART.*

By W. Austin Currie, D.D.S., Instructor in Carving and Plastic Manipulation, Boston Dental College.

The writer complains that dentists know so little about art. There are no facilities for cultivating an æsthetic taste in the dental colleges. He draws attention to the fact that the artist to produce an accurate picture of living beings must possess an accurate insight into human nature, must know his anatomy, physiology and so on.

He adds :—Now, if this knowledge is indispensable to an artist, why should it not be equally desirable that the mechanical dentist should be conservant with its principles also? An artist, by making himself intimately acquainted with the human form, and by his perceptiveness, power of imitation, and deftness of hand, can place a representation of it upon canvas. With the dentist, the object is the same ; but, unlike the artist, he has not blank canvas or hard stone to work upon, but has living tissues on which he can learn to put different expressions. Many will say that expression comes from the mind, and that we have no control over it except in our own features. True, it comes from the mind, but it shows itself upon the face, and different expressions are but the result of the action of different muscles in moving portions of the skin (and underlying tissues) so that a new light strikes upon it ; this varying light, with its consequent shade, adds a new aspect to the countenance.

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* Read before the Annual Association of the Boston Dental College, Boston, October 13th, 1885.

As with the picture. it takes but the slightest change in position of the lips and adjacent parts to make a great change in expression. The writer points out that this can be easily shown by taking two similar photographs and shading one and not the other. The lips, of all the features, are the most direct index to the feelings, and the expression characteristic of every face is due almost entirely to the effect of light and shade about the lips. It is the overlooking of this fact which often makes the dentist's work disappoint him and his patient. He has altered the expression of the lips and of the whole face, and the result has not been pleasing. He deplores that, although mechanics are so freely taught, expression and kindred subjects are wholly overlooked in dental schools. To derive any professional benefit from the ideas here suggested, the first requisite is to study nature, and study closely. As far as the human countenance is concerned, no one has more opportunity for observation than the dentists. Our business carries with it a certain license, so that we can examine a patient's features critically without giving offence. He suggests that dentists should note the general expression, the fulness of the lips, and the tooth development beneath them. Watch where and how the light strikes the face, and what is the result of different lights upon the same features. If any teeth are absent, note the effect upon the expression. Observe colour of hair, eyes, and complexion, and then examine the exact shade of the teeth, also the size and shape of the teeth as compared with size and shape of features, form of head, and general build of body. This can be done by a trained eye, while the patient undergoes the usual examination without suspecting but that your undivided attention is given to the teeth. Then compare this with the next face that presents itself. If this is to afford any benefit to the practitioner, the observation and comparison must be critical. We are too apt to bestow a casual glance, and forget as soon as the patient is gone, whereas we should memorise or make a note of the most important points.

To become *masters* of the art of light and shade, dentists *must cultivate a taste for art.* Art periodicals and art gossip should mix with purely dental literature and technical studies. Suppose, he adds, that we cannot see at first that it is benefiting our work, we cannot deny that it is refining, as well as affording a pleasant change from an occupation that is in many respects disagreeable. Then when we have leisure we can turn our hands to a little modelling.

It is suggested that dentists, if they have a small space in their laboratories, should utilise it by making a bench in a corner that has a good light, and then investing in a few pounds of artists' clay and one or two modelling tools. By an hour's work and the outlay of a few pounds, we have a way of passing our spare moments that will be novel and instructive. For it is in modelling and casting that the effect of light and shade is made most manifest. If we have doubts of our ability to reap any benefit from modelling, why not try casting, choosing a friend or a patient's face for a subject? Suppose that we try it in this way, our subject being a person who wears a full denture and with a bare face? First make a mould of the face (wax will answer) with the mouth empty. Then one with the plates in position, and then, after building up with wax in different places on the plates, place them in the mouth and make a third mould. Now to cast with plaster. The wax mould will of necessity be thin, so that it is best before casting to build up around the outside of the mould with sand so that the weight of the plaster, when soft, will not change the shape. Then if you will tint the water with powdered or dry umber and a little vermillion before you mix the plaster, the latter will more nearly resemble the flesh-colour. After casting all three, and allowing the plaster to set, if you will remove the wax from each you will be surprised at the entirely different expression on each face.

Dental News.

ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.

The second meeting of the Session 1885-86 took place in the Society's Rooms, Edinburgh—W. Bowman Macleod, L.D.S.Ed., President, in the chair.

After the reading of the minutes the President announced that the discussion upon Mr. H. H. Edwards' paper, on the "Missing Incisors in Man," would be then taken.

Mr. Wilson said he had listened to the reading of the paper with much pleasure, and he was very much pleased to learn that the short paper he had read to the Society in March had had the effect of bringing into the field such a close observer and skilful artist as Dr. Edwards.

Case 1 shews a state of the incisors he had never seen in the permanent series, and but twice in the temporary. He differed from Dr. Edwards in that he considered the extra teeth to be not the central pair, but the first lateral, although these are remarkable as being larger than the central; one thing certain was that it was not the second, or outermost lateral pair.

Cases 2 and 3 represented cases with which most present were familiar.

In Case 4 he did not see any ground for calling the incisor in relation to the right canine anything but a dwarfed normal lateral, difference of form in the pair of these teeth being not unfrequent, and the space between it and the central was not so large as to require accounting for.

In Case 5 the space occupies the line of the maxillo-premaxillary suture, and is more likely to be connected with the development of the bones than with the teeth.

Case 6 was, in his experience, a common form when the laterals were suppressed.

In Case 7 the incisor between the central and canine on the right side, he regarded as a dwarfed normal lateral, and case 9 only differed from it in that the lateral is more rudimentary in form. In the majority of similar cases which had come under his own notice, the solitary lateral was conoid.

Case 8. The tooth so beautifully reproduced in ivory he did not consider a geminated tooth at all, but what was much rarer, a double-rooted lateral, the extra root being due to the malformation of the cingulum, the two sides of which had not united, the small root being a continuation of the distal half.

Laterals were extremely liable to have the cingulum malformed, but it was certainly very rare to find it resulting in an extra root, as in this case.

He had only met with one, which he would pass round, and they would see that it only differed from Dr. Edwards' one in that the distal root continued in contact with the larger root.

As shewing that the same thing occurred in other teeth, he passed round an under canine, in which they would see that a fault in the labial cervical margin of the enamel was accompanied by the presence of an extra root, which started just a little below the neck on the same surface.

As regarded the use of the term "geminous tooth," or as more frequently styled geminated, Dr. Edwards was quite correct, as there were three forms—1st. lateral union of both crowns and roots; 2nd, union of crowns, roots more or less distinct; and 3rd, crowns more or less divided, roots united.

The existence of one or more pulp cavities and canals, depending on the extent to which the conjoined teeth had lost their individuality.

The quotation from Dr, Thomson's paper, however well it might apply to members liable to hypertrophy or atrophy, according as the individual used them, bore little on the subject before them. Hereditary defective structure was extremely general, but certainly not any prevalence of aberrant, or rudimentary forms. Conoid laterals, bicuspids, and third molars are still in a small minority.

It might be said that want of use leads to defective development of the jaws, and that in turn to suppression of certain teeth owing to want of room, but this conclusion is largely an assumption.

Undoubtedly rudimentary forms in certain teeth, as also suppression of the same, are hereditary more or less for a generation or two, but the customs of civilised man do not encourage their persistence. In lower animals either could readily be made a permanent variety.

As to the suppressed incisor being the central one, he thought that on two grounds they might put it out of court,—1st, the incisors in man being largely prehensile, and the centrals normally the strongest and most important, they should be the last to be suppressed ; 2nd, when five or six incisors are present, it is very exceptional for more than two (the centrals) to be of the central type.

No conclusion can be drawn from the period of eruption, as in the permanent series the overcrowding frequently leads to the retarded eruption of the centrals long after the laterals and supernumerary teeth were in place. In two cases of extra incisors, which came under his own observation, the middle or second incisor erupted after both the central and outer incisor were in place. While in the third all four laterals were more or less advanced (the outer ones most so) before the centrals erupted.

In the temporary series there was little irregularity produced by their presence, but there seems a strong tendency to the extra incisor being geminated to one or other of the normal one.

What he regarded as the typical form of the lateral incisor was just that described by Dr. Edwards. It differs from the central (taking its labial aspect only) in being more V shaped, in its lateral convexity being greater and most pronounced nearer to its mesial side, and in being shortened to and rounded off at its distal cutting edge.

Digressing to the missing premolars, his own observations would lead him to say they were the third and fourth.

As regarded the supernumerary teeth not unfrequently met with to the buccal surface of the molars, he was rather puzzled, having met them between the first and second, second and third, and in one case to the distal side of the third molar. He had also met with a few cases in which they were geminated with one or other of the molars. So far as he had seen they differed considerably in form from those met with in the front of the mouth.

He was afraid he had occupied too much of their time, and would conclude by asking them to compare closely the lateral and canine he had sent round, with the lateral (Case 8) of Dr. Edwards, and say whether they agreed with him.

Mr. Amoore said he had listened with great interest to Mr. Wilson's close criticisms upon the paper, and if there was more to be learned from differences of opinion than from concurrences, they might hope to learn something from what they had heard that evening. He dissented from Mr. Edwards in his opinion that of the incisor teeth, the centrals would be the most likely to be suppressed first. To quote from the text of his paper—"The incisors are the teeth of prehension, and the centrals naturally are the most prehensile; therefore, if suppression has taken place through disuse, I infer that the original centrals would be the first to disappear." Now, if suppression has taken place, it would surely be the less used side teeth which would disappear previous to their more serviceable centrals neighbours. This view is borne out by references to comparative dental anatomy, where the side teeth sometimes become quite rudimentary or are lost, while the centrals often rather developed and increased in size and strength.

He then exhibited a model of a well formed upper jaw in which there were two teeth erupted buccally between the second and third molars, and which tallied exactly with a similar case referred to and described by Mr. Edwards. One of the supernumeraries had been extracted and showed a conical root, while the crown more resembled a bicuspid than a molar, and although he had no strong grounds for his opinion, he could scarcely bring himself to believe that they were representative of a lost third pre-molar, springing up in this out-of-the-way position; he thought it rather straining a point, whenever a supernumerary tooth appeared, to give to it a place as a reappearance, in imperfect form, of a tooth once commonly present but now suppressed. In the same way he differed from Mr. Edwards, though confessing that he had not given the matter so much attention as he (Mr. Edwards) had done, in so often assigning, as a reason for spaced teeth, that it was an effort on the part of nature to allow room for a tooth once present in the jaw, but now absent. This was notably the instance in Case 5, already referred to by Mr. Wilson, in which a space existed between lateral and canine on the one side of the mouth only, and, as had been remarked, was more likely to have been caused by an irregularity in the development of the bone at the inter-maxillary suture—or possibly the undue retention of a temporary tooth on that side, or it might even be due to an irregular articulation with the lower jaw. How common it was to find, when the laterals were absent, that the centrals were spaced, and when, during the eruption of the incisor teeth in children, a long interval of time elapsed between the appearances of the centrals and laterals, the centrals often remained with wide spaces between them until the laterals came down, when the space gradually closed up. He had models of a jaw in his possession which he should like to have had Mr. Edwards' opinion upon, it was a typically well formed and faultless mouth and jaw, with the teeth all present, but on either side between the canines and the first bicuspid there existed well marked spaces. From their position he would attach no significance to the circumstance, attributing it rather to the effect of the articulation with the lower jaw than to any other cause. Returning, however, to the missing incisor again, he had a case, of which, he regretted, he was unable to exhibit the models. In it a temporary supernumerary lateral was succeeded by a supernumerary permanent lateral, in either case it being impossible to determine, from the crowns, at all events, which was the extra tooth.

With regard to the carved ivory model of a lateral tooth, which they all admired so much, he was more inclined to agree with Mr. Wilson's views upon the question, and think it more probably a double rooted lateral than a geminated tooth, although he scarcely thought that the teeth Mr. Wilson had passed round proved his point, though they certainly tended to confirm it.

After several members had taken part in the discussion, the President said that nobody would be more pleased than Mr. Edwards himself in reading those opinions which differed from his own.

The President then called on Mr. Watson for his promised demonstrations for the evening.

Mr. Watson proceeded to give an exhibition of slides, illustrative of Dental Pathology and Physiology, by means of the Limelight Lantern Microscope.

Without attempting to describe the instrument technically, there were a few points in connection with it that would be interesting to remark upon. To fit up the lantern for the microscope, the ordinary objective in connection with it is removed, and the microscope lenses and apparatus screwed on, the objectives used on this occasion being 150, 90, and 30 diameters, on the relative value of which, in connection with the lantern, some remarks are made further on. One of the most ingenious contrivances in connection with it was the method by which a continual supply of oxygen could be maintained without the inconvenience usually attendant when bags are employed. The gas-holder consists of a bell capable of containing about 1½ cubic feet of gas, inverted in a water chamber below, holding a good sized bucket full of water. This arrangement when in use serves as a stand for the lantern, and when emptied for travelling, the lantern can be packed away within it. The supply of oxygen is obtained from heating by means of a bunsen burner, a cake made of powdered chlorate of potash, and the black oxide of manganese enclosed in a strong iron retort, whence the oxygen is evolved and conducted by a tube into the gas-holder ; when more gas is required, another cake is supplied, and the process repeated, and thus a continuous supply of the gas can be maintained as long as desired.

The exhibition was a very interesting one, and shewed the microscopical conditions of the teeth, from the germ to maturity, and in the different stages of disease ; and towards the end sections of tumours having relation to the mouth were also exhibited. The sections were best seen with the lower powers of the microscope, as at present it was impossible with the instrument to bring out the smaller details as clearly as when the object was examined upon the stage of the microscope in the ordinary way, the definitions becoming indistinct as the powers were increased.

Later on Mr. Watson exhibited some photo-micrographs of the dental structures, in which the details were brought out in a very satisfactory manner, and if by further adjustment and development the lantern microscope could be made to transmit as clearly the image, from the mounted specimen to the canvas direct, it would prove an almost indispensable instrument for purposes of instruction in class lectures.

At the conclusion of the exhibition, the President complimented Mr. Watson on the success of the demonstration, and tendered the thanks of the Society to Mr. Watson for his interesting and instructive exposition of the microscopic strutures of the teeth.

On January 14th, 1886, the third General Meeting of the Session 1885-86 took place at the rooms, 30, Chambers Street—the President, Mr. Bowman Macleod, L.D.S., in the chair.

After the conclusion of the formal business, the President called on Mr. Price for his remarks on Dr. Coffin's method of treating irregularities by means of the "split plate" and the use of piano wire. Through the kindness of Mr. Harold Coffin, he was enabled to exhibit a large series of models, illustrating the different types of results that could be obtained through its agency; and also plates and cases in the various stages of preparation, showing the most advised methods of construction. As the subject had been so thoroughly treated by Mr. Walter Coffin, and already chronicled in the Transactions of the International Medical Congress in 1881, (vol. III. p. 542) it was thought unnecessary to republish any of the matter in the Society's Transactions, but as many of those present had either not seen, or had had no opportunity of examining the models at leisure, they were the occasion of considerable comment, and some of the details of their construction and technical "wrinkles" were new to several. Many of the members who had adopted it testified to its simplicity and value, at the same time venturing to doubt if in some of the examples before them, the expansion treatment had not been ill advised, and that extraction would have yielded better results; but as they had not the lower articulations with them, nor the contour of the patient's face to assist them in their judgments, they were unable to pronounce any final opinion.

In summing up the opinions of members, the President said that he regretted very much the impossibility of sharing with absent members the great good which those present derived from the presentation of such a practical subject in the form in which it had been brought before them. Most of the members questioned the expediency of some of the operations for expansion of the arch as illustrated by the models on the table, and he quite agreed with them, and very possible Mr. Coffin might now also share their views. One thing, however, was certain, that the introduction by Mr. Coffin of piano wire for regulation of teeth and expansion of the arch was a decided step in advance of any previous contrivance for these purposes. It was a remarkable illustration of the power of simple instruments when directed by brains. He had much pleasure in moving a cordial vote of thanks to Mr. Coffin for the loan of the series of illustrations, and also to Mr. Price for his most entertaining and lucid description of them.

CASUAL COMMUNICATIONS.

The following communication from Mr. John Wood, D.D.S., L.D.S.Ed. & I. (Dumfries), was read :—

In last month's Journal of the British Dental Association, brief reference is made to an untoward accident at Barnstaple, in which the blade of a pair of upper bicuspid forceps broke off during an operation, and slipping down the trachea, became lodged in the right bronchus, from which it was extracted by Sir William M'Cormac, seven weeks afterwards. In the *Lancet* of the 2nd inst., there is a most interesting account of the whole case, with illustrations showing the broken instrument, and position which the blade occupied in the bronchus. It appears that the broken instrument has the name of Evrard upon it, but some doubt has been expressed as to whether it is a genuine instrument of his make, or merely an imitation of a spurious character. Be that as it may, by way of showing that such an accident is possible, even where there can be no question as to the genuineness of the manufacture, I submit for inspection by the members of the Society, a pair of excising forceps by Evrard, in which there is a fracture extending half way across the neck of the left blade in pretty much the same situation, and so far in the same direction as that which the line of fracture takes in the broken pair figured in the *Lancet*. As will be observed, however, the fracture in this pair, instead of continuing its course *across*, has taken an inclination towards the line of the handles, which in some measure accounts for the blade not breaking off altogether, as in the Barnstable case. That this instrument was made by Evrard is beyond dispute. It bears the well-known impress of his name, and forms one of a set of twenty instruments furnished by the late Mr. Evrard to special order, and presented to me by a patient. The mishap to this pair happened a short time ago, whilst being used in excising an upper front tooth, and surprised me not a little, having regard to the apparent strength of the part at which they gave way.

Mr. Stirling showed a continuous gum facing, from Verrier's furnace, where the platina wire was soldered to the pins of the teeth with dental alloy. He said the advantage of dental alloy over pure gold as a solder is that it remains around the pins (where it is placed) until after the piece has been finally fired, whereas the gold usually runs away from the pins and flows all over the platina wire.

Mr. Stirling also presented to the Society's museum the molar of a horse, the roots of which were involved in an odontome of considerable size, and which he had exhibited at a previous meeting.

Mr. Wilson exhibited an upper lateral, which simulated in a remarkable degree a lower canine.

Mr. Macgregor showed two models, the one of the mouth of a girl of 15, with a well marked V shaped maxilla. The teeth were prominent, and he judged that the conformation of the mouth was due in a very great measure to the habit of food sucking, of which he knew the patient was guilty.

The second model was of the upper jaw of a girl of 12, and was peculiar in exhibiting a first right bicuspid of abnormal size and shape, from its appearance giving one the idea that it was probably a geminated tooth.

ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.

The Fourth Ordinary Meeting of the Society was held in the Rooms, 30 Chambers Street, on Thursday, 11th February—W. Bowman Macleod, L.D.S., President, in the chair.

At the conclusion of the formal business, the president called upon Mr. Macgregor to open the discussion, as announced for that evening, upon the treatment of the teeth of children up to the age of 12.

CASUAL COMMUNICATIONS.

Mr. Macleod exhibited a model of a case of Epulo-fibroid tumour in the lower jaw. The case was interesting, from the age of the patient, and owing to the cause of the tumour's growth. The girl was between the age of 9 and 10, and had six months previous, got a fall which broke the crowns of the first temporary molar and canine, on the left side. Portions of the roots of the temporary teeth had been left in, and the growth was apparently the consequence of the disturbance of the nutrition caused by the blow and continuous irritation of the ragged edges of the retained roots. The tumour extended from the centre of the left lateral incisor to the second temporary molar, and was about an inch and a quarter long by three-quarters of an inch deep. The tumour was excised by Professor Chiene, at the Royal Infirmary, where the girl was a patient, and the case is progressing favourably.

Another model exhibited by Mr. Macleod, showed a supernumerary central incisor. This model was accompanied by the normal central, left, and the supernumerary central teeth, which had been extracted. The crowns were large and well developed in both cases, but the roots were stunted, and in the case of the supernumerary tooth, was also twisted upon itself.

Mr. G. W. Watson gave an account of the removal of an epulis by him from a patient, a female, aged 21. She was very anæmic and delicate looking, and complained of a growth in her mouth which was noticed first some 5 years ago. On examination, he found on the lingual surface of superior maxilla, an elongated oval epuloid tumour, occupying the spaces between the central incisor (left) and the second premolar (right). It was pedunculated, the attachment being in the neighbourhood of the lateral incisor. Ulceration of the growth had taken place from the fact that the lower teeth bit into it on closure of jaws, causing a great deal of pain as well as preventing the patient from taking a proper amount of nourishment, thus accounting for the delicate appearance presented. He gave the patient a full dose of gas and removed the lateral incisor, which was slightly carious, and seizing the growth with a pair of artery forceps, cut it freely away ; then using a bone gouge, he cut away a portion of the adjacent bone and applied zinc chloride freely to the cut surfaces, and took the opportunity, at the same time, to remove the second pre-molar (left), which was abscessed and had caused a good deal of pain. The whole was managed, fortunately, before the patient regained consciousness.

The parts healed rapidly, and at present time, rather more than two months since the operation, the mouth is in a perfectly healthy condition and the girl in first-rate health. On making a microscopic examination of sections of the tumour, he found it very soft in texture, and containing no bony spicules so common in such growths, its histological structure being fibro-plastic, with an unusual amount of myeloid cells present. He also remarked that it was from such cases, when there was a certain amount of irritation kept up, that a growth of this description would be liable to become purely myeloid in character if not removed at once.

Mr. E. A. Cormack, in exhibiting the following 4 cases, stated that they had come under his notice since the reading of Mr. Edwards' paper, and it will be seen that in them all there is some peculiarity to be observed regarding the laterals.

No. 1. Model of the upper jaw of a gentlemen, æt. 27. The mouth and teeth are well developed, but there is a space of about $\frac{1}{8}$th of an inch between the central and the lateral incisors, on the left side. The patient believes this to be normal, but the deficiency of several lower bicuspids and molars may, by affecting the bite, serve as a clue to the origin of the slight abnormality.

No. 2. Model of upper jaw, lady, æt. 25. The mouth and teeth well developed, canine suppressed on left side, lateral suppressed on right, otherwise the teeth normal.

No. 3. Model of upper jaw, gentleman, æt. 26. Mouth and teeth well developed, with the exception of right and left laterals, which are rudimentary. An interesting point about this case is that, while his eldest brother has normal laterals, in his elder brother they are partially rudimentary, and in his sister, aet. 23, they are missing altogether.

No. 4. Model of an upper jaw, and teeth well developed. It shows two supernumerary laterals placed behind the normal laterals, which are also present. The canines are very prominent. The teeth being large and also numerous, give an extremely ferocious aspect to an otherwise placid countenance.

Another model shown by Mr. Cormack, exhibited the effects of a blow from a golf-club on the backward swing.

The patient is a schoolboy, æt. 11. The right central is fractured across the neck, the left central has the mesial corner smashed off, while the crown is split from the cervix to the cutting edge, dividing it into an anterior and a posterior portion, of which the latter is movable. The blow also damaged three lower incisors by removing a third of their substance from each.

Mr. Wilson exhibited two cases ; in the first, an upper model, the second bicuspid on the right side was very much smaller than the first, while on the left it was much less marked. In the second model, a lower, the left second molar was of a very abnormal form (resembling a large second bicuspid) ; both the first and third molars were splendidly developed.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary Monthly Meeting, February,1st. 1886.

T. Charters White, M.R.C.S. & L.D.S. Eng., President, in the Chair.

The Minutes of the previous meeting having been read and confirmed,

The President announced that the following gentlemen had been duly nominated as candidates for membership, and would be ballotted for at a subsequent meeting, viz :—

Messrs. Charles Moulden Bayfield, L.D.S.I., 9, Talbot Road, Westbourne Park, W., and Charles M. Cunningham, D.D.S. Michigan, 2 King's Parade, Cambridge.

The following candidates were then ballotted for and elected members of the Society, viz :—

Messrs. Peyton Grenville Lavason, L.D.S. Eng., 12, Bridge Street, Hereford ;
J. Charles Storey, L.D.S.I., 9, Regent's Terrace, Anlaby Road, Hull ;
Walter Harrison, L.D.S. Eng., D.M.D. Harvard, 98, Western Road, Brighton ; and
Morgan Hughes, M.R.C.S., L.D.S. Eng., 4, Wellesley Villas, Croydon, as non-resident members ; together with
Henry John Kluht, L.D.S. Glasg., 44, Norfolk Terrace, Bayswater, W., as a resident member.

Mr. Weiss announced that Dr. Magitot, of Paris, had forwarded as a donation to the Library, by the hands of Dr. Harlan, copies of several works and reprints of articles lately published by him, including the article "Dent" from the "Dictionnaire Encyclopédique des Sciences Medicales," vol. xxvii, "Recherches sur l' Evolution du Follicule Dentaire," "Les Lois de la Dentition chez les Vertebres," "Etudes cliniques sur l'Erosion des Dents," and several others. He had also to acknowledge the receipt of the Calendar of the Pharmaceutical Society for the current year.

Mr. Storer Bennett reported that he had received three photographs, kindly taken by Mr. Charters White, of the microscopic sections of the fractured and re-united tooth which had formed the subject of a communication from Mr. Dunn, of Florence, read at the November meeting. A copy of one of these is published with this number of the *Transactions*.

Mr. Arthur Underwood submitted for examination two cases of replantation.

The patients were two girls about eleven years of age, and about fourteen months had elapsed since the operation. In one case a lateral and in the other a central had been extracted on account of irregularity, and replaced. In each case the operation succeeded without a bad symptom ; there was no tenderness after forty-eight hours, and the teeth soon became quite firm. The roots were not quite fully calcified.

He believed, and he would give his reasons for this belief, that these teeth had living pulps, and therefore that teeth, if only removed from their sockets for a short time and replaced, need not necessarily be devitalised. No one doubted that a replanted tooth regained a certain amount of vitality by means of the re-united periosteum, but most denied that the nervous and vascular connections of the pulp could be re-established through the apical foramen, asserting that this was impossible owing to the small size of the aperture. But as the process of union was microscopical, it was evident that the size of the foramen could not be an obstacle, whilst a consideration of what took place under similar circumstances in the case of other organs of the body rendered the statement he had made still less improbable. Thus, if a portion of skin was removed with its vessels and replaced, it would re-unite; so also a divided nerve would re-unite and its functions be re-established. And if this could take place in other organs, why should it be impossible for the vessels and nerves of a tooth which had been extracted and replaced to re-unite?

He maintained that this had taken place in the cases now shown. If the pulp had died, the teeth would have become discoloured. This discolouration was due to a change in the contained blood, and since the tooth of a young person was more vascular than that of an old person, a greater amount of discolouration might have been expected in these patients on account of their youth. The discolouration was generally more marked after sudden death of the pulp than when this occurred after a period of disease. A marked change of colour might therefore have been expected in these teeth; but instead of this their colour was exactly the same as the other teeth; it was impossible to detect the slightest difference. The sensibility to heat was also precisely the same; on touching them, or one of their neighbours, with a hot burnisher a sharp pain was immediately experienced, whilst in the case of a dead tooth, the pain was only felt after an appreciable interval. This difference was noticeable also when cold applications were used, but it was not so marked as with hot.

But, by the permission of the President, he was enabled to submit the teeth to a further test. On darkening the room and applying a strong light behind the teeth, it would be seen that these were transparent,—that there was not the slightest difference in translucency between the replanted teeth and those which had not been interfered with. In order to shew the difference he had a patient present who had a dead tooth, and it would be noticed that it was decidedly less transparent than its neighbours,—presenting a cloudy appearance,—whilst a spot of caries was at once detected by its opacity.

The lamp he was about to use was one supplied by Messrs. Ash, the flame of which was enclosed in a metal chimney which had only one aperture admitting a narrow glass tube curved at the further end. The light travelled along this tube to its extremity, and could be directed at will upon any point in the mouth. It was fully equal, if not superior, in power to the electric light, being sufficiently powerful to render a tooth and even the alveolus fairly transparent, and was, owing to the entire absence of heat, very comfortable to the patient.

He would remark, in conclusion, that he was not an advocate of replantation, preferring torsion whenever this would answer the purpose; though, in the case of laterals, owing to the flattened shape of the root, torsion could not usually be performed satisfactorily.

Discussion.

The President remarked that members ought to be greatly obliged to Mr. Sutton for his very interesting series of papers. He believed that most of them knew very little about the oral diseases of animals until Mr. Sutton called their attention to the subject. Busy practitioners had few opportunities of reading up collateral subjects of this kind, but some of their patients were very omnivorous readers, and were apt to ask puzzling questions respecting matters which they, as members of a learned profession, might be expected to have some knowledge of. It was, therefore, a great advantage to be instructed by such a comparative anatomist as Mr. Sutton.

Mr. Chas. Tomes said it was always dangerous to criticise Mr. Sutton's papers on the spur of the moment, since he was not in the habit of making suggestions without having carefully considered the point discussed, and it was therefore desirable to have some opportunity for thought before venturing to question his conclusions.

But he (Mr. Tomes) was scarcely prepared to follow Mr. Sutton in his proposal to abolish one of the recognised dental tissues. The term osteo-dentine, as applied to pathological products of the pulp, might perhaps be abandoned without inconvenience, but he thought it would be decidedly inconvenient to abandon it altogether, especially as applied to such organs as the teeth of the pike. In these the tooth pulp first forms a thin external layer by the calcification of a surface layer of cells—odontoblasts in fact; but the whole interior of the solid tooth—nine-tenths of it at least—is formed by a connective tissue calcification of the body of the pulp. Thus whilst he agreed with Mr. Sutton that osteo-dentine was always a connective tissue calcification, whereas true dentine was a calcification of specialised surface cells, and that therefore it had much more in common with bone than with dentine, yet he thought there would be more loss than gain in nomenclature if its use was abandoned altogether—at all events for those teeth on which almost the whole of a specialized dentinal pulp become converted into it.

Mr. Sutton's suggestion as to the cause of the curling tooth of rodents and other animals was ingenious, and would account for the curling in many cases, but not in all. For instance, in the case of the widely curling tusks of the mastodon it was difficult to see where attrition could come in as a factor in causing the curvature, seeing that there were no opposing teeth.

Mr. F. J. Bennett thought the curling of teeth could not be satisfactorily accounted for by the merely mechanical cause suggested by Mr. Sutton. The rule was that friction stimulated nutrition, and was attended by increased growth in that part. The curling of leaves was found to be due to more rapid growth of that surface which received the larger supply of nutrition, and he thought the curling of tusks must be the result of unequal growth due to a similar cause.

Mr. Storer Bennett also criticised Mr. Sutton's explanation of the curving of teeth, pointing out that the lower incisors of rodents did not get worn on the upper surface, though they curved in that direction ; and, secondly, that these teeth were curved before they left the jaw-bone or met with any attrition. Nor did he believe in the pathological ancestor of the babirussa.

He had noticed in the Zooloigcal Gardens a tiger which had a remarkable growth in the mouth which always became larger just before feeding time ; the tumour looked as if it might be an enlarged salivary gland. He believed the animal died about three months ago ; was this the one Mr. Sutton had referred to ?

Mr. Sutton, in reply, said he agreed with Mr. Tomes that it would be inconvenient to do away with the term osteo-dentine unless a better one could be suggested, and this he was not at present prepared to do. Nor did the name very much matter so long as it was borne in mind that the tissue to which it was applied was a simple calcification of the connective tissue of the pulp, and differed entirely both in structure and origin from true dentine.

With reference to the objections which had been made to his suggestions as to the cause of the curling of certain teeth, he begged to be excused entering more fully into the subject at that meeting, since this would necessitate his anticipating an important part of a lecture which he had to deliver on that day week at the Royal College of Surgeons, in which he proposed to discuss this question at some length.

The tiger referred to in his paper was one which had been presented to the Prince of Wales during his Indian tour. It had a warty growth on the lip, which the keeper informed him used to swell up at feeding time, but after death it appeared quite collapsed and unimportant.

The President, having thanked Mr. Sutton in the name of the Society for his interesting paper, and also Mr. Underwood and the other contributors during the evening, proceeded to read the Inaugural Address. (See p. 239.)

APPOINTMENTS.

At the quarterly meeting of the Committee of the Birmingham Dental Hospital, Mr. William Palethorpe, L.D.S., late of Queen's College and London, was elected House Surgeon.

Mr. D. Steward Hepburn L.D.S. Eng. has been appointed Honorary Dental Surgeon to the Nottingham General Dispensary, vice, Mr. William Goddard, L.D.S., resigned.

ODONTO-CHIRURGICAL SOCIETY.

The Annual Meeting of the Odonto-Chirurgical Society (Session 1885-86) was held in the Rooms, 30, Chambers Street, Edinburgh, on Friday, 12th March, at 2 p.m.—W. Bowman Macleod, L.D.S., President, in the Chair.

PASS LIST EDINBURGH COLLEGE OF SURGEONS.

John Masters, Manchester, Frederick William Masters, Rusholm, Manchester, Frederick Benson, Somersetshire, passed the first professional Dental Examination at Edinburgh, Jan. 27th, 1886.

British Journal of Dental Science.

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DENTAL AND ORAL CASES IN ANIMALS.

By J. Bland Sutton, F.R.C.S.
Erasmus Wilson Lecturer on Pathology, Royal College of Surgeons; Lecturer on Comparative Anatomy, and Assistant-Surgeon to the Middlesex Hospital.

(*Concluded from page* 251.)

Curved Teeth.—Abnormally long and curved teeth in animals whose incisors and canines grow from persistent pulps are cases so well known that they have almost ceased to be of interest. I propose, however, even in the face of this statement, to offer a few remarks on the curved and elongated teeth of the Suidæ.

The first specimen to be mentioned is a curved canine of a wild boar, lent me by Mr. Clarence Bartlett. It measures six inches across the curve, and is fifteen inches long when measured along the outside of the circle. A glance shows that the apex of the tooth is within three-quarters of an inch of its own pulp cavity. Judging from the appearance presented by the apex of the tooth, at least two inches of it must have been embedded in soft tissues, and had the animal lived, the apex of the tooth would have entered its own pulp. The Museum of the Royal College of Surgeons, London, possesses some examples of this kind of tooth from wild boars; there is one in particular which had been worn as a charm by some individual, which resembles my specimen in every particular except that it is not quite so large.

Mention must also be made of the remarkable specimen, preserved in the same Museum, which was figured and described by Cheselden in his Osteographia.

It is difficult in Cheselden's original drawing to make out one tooth from the other after they have penetrated the bone; and further, Cheselden's artist did not reverse the figure on the wood, which leads to more confusion.

In the excellent museum attached to the Veterinary School at Alfort, I had an opportunity of examining a specimen of overgrown lower canines in a boar which had been presented by M. Goubaux. This admirable specimen in nearly all points agrees with Cheselden's specimen. We have in these examples abundant evidence that there is a great tendency on the part of the canines in this group to become abnormally elongated.

The Museum of the Odontological Society has among its treasures an interesting specimen from a Hippopotamus, where an overgrown tooth had grown in this way so that the apex had actually re-entered the pulp chamber. Other specimens of this character have been reported, but I am unacquainted with any which approach this one in the complete formation of a circle.

The point which is of especial interest to me in these cases of curved teeth is, that all members of the pig family exhibit this tendency—the boar, the hippopotamus, the wart-hog, Red River hog, and babirussa. In a paper communicated to the Zoological Society in 1885, I endeavoured to show that the curiously curved canines so characteristic of the male babirussa, which have so long been a puzzle to naturalists, must be regarded in no other light than a pathological condition which has become transmitted, so as at length to become a racial character.

We see the earliest condition in the curved upper canine of the boar, the second or intermediate condition in the wart-hog, and the most exaggerated degree in the babirussa, besides occasional examples turning up in all members of the pig family.

Just a few words about the curving of the teeth. As to the cause of this many opinions have been held, but it is of simple explanation. Mr. Smith Turner reminded me that when the stockbreeder wishes to make the horns of the cows curl, he scrapes the inner sides with a piece of glass. As a consequence the horn curls towards the weakened side. This view is applicable to all the curved teeth I have examined, and especially to the circular teeth of the boars. The concave side of the curve always presents a worn surface where it has been played upon by the opposing tooth. Also in the incisors of rodents, the constant wear of their posterior surfaces weakens them in that direction, and a curve results, of which the convexity looks outwards and the concavity towards the mouth.

This curving towards the weakened side is very well illustrated in the elephant's tusk. In this particular case it is probable that some defect existed in the tooth germ, leading to deficient formation of the dentine, causing the tusk to become twisted into a spiral. The Museum of the Royal College of Surgeons possesses several examples of twisted teeth of this character. In all probability it is due to the transmission of some similiar defect in the teeth of the ancestors of the narwhal, that causes the enormous tusks of these remarkable mammals to present the singular spiral twist so characteristic of them.

On other occasions I have exhibited before this Society examples of alveolar abscess in Kangaroos, the result of injury to their long procumbent incisors. The following is an additional specimen :—

A Hypsiprymnus broke the apices of its two lower incisors, and as a consequence an alveolar abscess formed in each maxilla. The abscess has induced serious changes in the surrounding bone, and on the right side has led to necrosis of the singular trenchant premolar so characteristic of this curious group of marsupials. Both incisors have undergone necrosis, and the bone in the neighbourhood of the symphysis presents several cloacæ.

A study of these specimens, like others I have introduced to this Society, further supports the opinion that diseases of the teeth are not entirely brought about by civilisation. When the subject has been more fully investigated with the care it deserves, we shall find that animals suffer from dental affections to which man is happily a stranger, and although the possession of teeth is both a necessity and a privilege nevertheless it has numerous disadvantages.

DISCUSSION UPON THE TREATMENT OF THE TEETH OF CHILDREN.

(*Concluded from page 254.*)

Mr. Hepburn said it gave him very great pleasure to be present at the meeting that evening. He had listened with much interest to Mr. Macgregor's remarks in opening the subject brought before them for discussion. He thought they must be all of one mind in thinking it advisable they should do all in their power to retain the temporary teeth until the time when they would be cast off in the ordinary course of nature. To make this at all possible, one thing was essential, they must impress upon parents and those in charge of children the necessity for bringing them periodically to the dentist that they may have their teeth examined. Were this done they might be able to detect the first appearance of caries, and treat them effectually without a painful or prolonged operation, either of which decidedly lessen the chances of seeing that child again. Every effort should be made to win their confidence, and remove that dread and fear of the dentist which seems inherent in them. He had frequently put in very temporary fillings, and done very imperfect work, rather than give them pain or weary them at a first sitting. It was surprising how much they would allow you to do if you gained their confidence. He was averse to the extraction of the temporary teeth, except in cases where it could be shown to be absolutely required for the relief of pain, or to prevent irregularity in the permanent ones. He considered that their premature removal arrested the subsequent development of the alveoli, and so would narrow the entire arch. In this way they all knew that when a tooth was extracted, its successor or the one next it would move almost imperceptibly into the space thus made ; whereas, if allowed to remain until the absorption of their roots, the permanent ones will present themselves in a position anterior to the temporary ; and to retain them in this position nature will (with the growing teeth) build up an external wall of alveolus, which will increase the entire arch and secure room for the larger teeth. With regard to the first permanent molars, he thought a great deal of valuable time was frequently wasted in vain efforts to save them. He did not remember that he had ever regretted extracting them, but he had often had cause to regret not having done so. Their removal made room for all the other teeth, and especially for the more easy eruption of the wisdom ones, which for want of space were often arrested in their progress to the surface by being caught under the distal shoulder of the second molar, where they were retained, it might be for years, covered by a flap of gum, under which the food worked, and, decomposing, caused the decay of the teeth, so that when fully erupted they were found useless. These, with room, would in all probability have developed into sound and healthy organs. Of course he would allow them to remain (if so far sound) and even prop them up, until such time as the more permanent ones were able to take upon them the duties of mastication, and articulate correctly with the other teeth. There was one other point which he thonght they ought to urge upon parents and children, and that was the use of the tooth brush, which was a great conservator both of the temporary and permanent teeth. This practice of childhood became the habit of after-life, and would be found as necessary for comfort as the washing of the face and hands.

Mr. Wilson said he quite agreed with Mr. Macgregor as to the necessity of retaining as many of the temporary teeth in use as possible, and in the means to be employed to do so. Also, in the weeding-out of teeth whose sockets were the seats of frequent abscesses, as well as all necrosed roots. He was more especially anxious to preserve the upper canines and the second molars in both jaws, as their premature removal, in his opinion, involved a loss of space for the successional teeth.

It was surprising how many parents (and even medical men) regarded the first permanent molar as one of the temporary series, and so made no effort to save it till too late, a result which regular dental inspection would have prevented.

He considered it of very great importance that the permanent molars should be retained till the bicuspids were fairly in place, as, otherwise, the want of support to the lower jaw tended to the distortion of the bite, and to the throwing on the front teeth of an amount of pressure they were, in few cases, fitted to bear, and so the uppers were drawn outward.

In his opinion, the best time to remove a hopeless first molar was just in advance of the eruption of the second, as there was then some chance of part of the space being gained by the bicuspids and front teeth ; they could, at that age, always count on the movement forward of the other molars.

As to the advantage to be gained in the better development of the wisdom teeth, he did not place any faith in it, at the same time, with an easier eruption, they would most probably be in a better condition.

He had met with a good many cases in which, owing to the very early removal of the first lower permanent molar, the second bicuspid had erupted into the unoccupied space, and afterwards when the temporary molar was shed, a large space was left permanently between the two bicuspids.

As to regulating cases, he preferred delaying these requiring mechanical appliances to a later age, only treating those in which the upper incisors were caught by the lower ones, and those in which the removal of one or more teeth was all that was required to rectify them.

Mr. Mackintosh, in treating the temporary teeth when caries is established, said he used Sullivan's cement or extra plastic amalgam, also treating the first permanent molars in the same way, and capping the nerve pulp with gutta percha or fossiline when the caries was deep seated.

Except for decided crowding, he saved the first permanent molars, as sometimes the second molars were more defective in structure than the first, and the third molar might not appear at all.

He believed the first molars and second bicuspids were the most important masticators in the mouth.

When an anæsthetic was required for the extraction of the temporary teeth, he gave nitrous oxide gas in preference to chloroform.

Mr. Wilson said he decidedly preferred giving young patients chloroform when an anæsthetic had to be given.

Mr. E. A. Cormack agreed with the foregoing speakers that it was of the utmost importance that frequent and regular visits should be made by patients from an early ago. With respect to this he thought that Dr. Cunningham's case record cards would be found of great use to the practitioner, as it afforded him a ready means of reference, and could by slight additions be made to show the condition of the mouth at different ages and under varying conditions of health. He considered that too little attention was paid to the condition of the oral mucous membrane. He had found much benefit result from frequent light brushing and the use of diluted sal volatile, where the gums were swollen, vascular, and coated with thick, stringy, tenacious mucus. He used friction to promote healthy action, and sal volatile as a stimulant and antacid.

Mr. Amoore referred to Mr. Macgregor's remarks upon the treatment of exposed pulps in temporary teeth, and asked if he never employed arsenic to destroy them? In suitable cases, where it was probable that the root was still well preserved, he had used it with success, though never attempting to fill the root afterwards, as in a permanent tooth under similar circumstances. He remembered in reading Mr. Quinby's work, recently published, that the author was in the habit of treating teeth in this condition with arsenic, but never attempting to fill either root or tooth afterwards, but cutting the crown in such a manner as to allow the tongue to keep the cavity free from all lodgments of food. He had been rather struck by a statement made by that author, to the effect that during more than 25 years of practice he had never met with a case in which he considered premature extraction of the temporary teeth necessary. If an abscess was established upon the roots of a temporary tooth, he (Mr. Amoore) had usually found it necessary to extract, but, from all appearances, Mr. Quinby did not find it so, but simply opened up the cavity freely and made a clear exit for any gases or matter which might be forming, thus allowing them to escape into the mouth—a line of policy to be fairly questioned, as it kept the mouth in an unhealthy condition, and involved the risk of possible injury to the permanent successor.

Mr. Amoore had frequently noticed what was probably the common experience of all—that permanent teeth erupted a year or two before the usual time for their appearance were rarely strong, and soon exhibited signs of decay, while, on the other hand, those erupted latter than usual were stronger and better. He had one or two notable instances of the latter in his mind, of patients with remarkably good sets of teeth, who had retained one or two of their temporary molars for some years subsequent to their usual period of disappearance.

The President said, with regard to the use of arsenic in temporary teeth, his own experience led him to believe that it was quite safe, providing proper precautions were taken ; that it served a useful temporary purpose, but that sooner or later abscess would follow, and the tooth require to be extracted.

Carbonate of soda was a most useful powder for children's teeth which were carious, and subject to slight aching after meals, and a small piece of common soda placed in a hollow tooth was a good remedy for toothache. The perfect administration of nitrous oxide for children under nine or ten years was extremely inconvenient, although not more dangerous than at any other age, and was occasionally accompanied by opisthotonos, at any age under puberty, a condition which ought not, however, to prevent the operator from proceeding with his work.

In his opinion, the extraction of the six-years-old molars should be symmetrical, and, if possible, delayed until the eruption of the bicuspid teeth.

Plastic fillings were best adapted for temporary teeth, and for permanent teeth, until such time as these were fully developed and matured.

On the subject of treatment of irregularities, he was at one with those who judiciously assisted and awaited natural developments ; deferring the intervention of regulating plates or apparatus until the eruption of the second molars, except in some few cases, an example of which is given in the biting of the upper incisors within the arch of the lower incisors.

The President, in closing the conversation, said that although nothing absolutely new had been suggested in the treatment of the teeth of children between the ages of four and twelve, yet there have been a few modifications of standard treatment advocated, which must add considerably to our resources when dealing with cases not amenable to the routine practice.

DENTAL MICROSCOPY.

By Herbert Williams.

(Concluded from page 200.)

Class II.—Softened Sections.

Several reagents are commonly employed for this purpose, and all seem to act by the removal of the calcareous matter and the hardening of the soft tissues of the teeth. The first in importance is decidedly chromic acid. This acid may be readily obtained in the crystalline form, but as it is very deliquescent I find it is more convenient to add a little water, as it is then more easily manipulated.

Having obtained a perfectly fresh tooth, you half fill an ordinary glass pickle bottle with water then add your chromic acid till the liquid is of a light straw colour ; now tie a piece of cotton lightly round your tooth, and suspend it in the bottle in such a manner that it is just well covered by the solution. I have found that teeth so suspended tend to decalcify more quickly than those left at the bottom of the vessel. Your solution should be changed every two or three days, and it may be gradually strengthened till it is of a pale sherry colour ; at the end of a week one or two drops of hydrochloric acid may be added, and will be found to materially quicken the process, which usually lasts from three to five weeks. When your tooth is decalcified, which may be tested by the amount of resistance it offers to the introduction of a needle, it should be withdrawn and imbedded in a microtome and thin sections cut with a razor. A few remarks on the working of the microtome may not be amiss as I found it rather more difficult to manage than I expected. Two substances are commonly used for imbedding, namely paraffin and thick gum arabic ; the former being employed where the tissues are fairly solid and do not risk being displaced by the pressure brought to bear on them by the knife, and the latter will be found invaluable for section of the soft tissues which will need interstitial support.

The vessel containing the paraffin should be immersed in hot water, and when it is semi-fluid, the paraffin must be poured on the plate of the microtome. Your tooth, previously dipped in the melted mass, should be placed, not in the centre of the plate, but nearer the side next the operator, so that it comes quickly in tact with the knife. For cutting sections imbedded in paraffin, the ordinary "Army" razor is found to be about the most useful instrument, as the hollow may be filled with methylated spirit, and the sections floated off the knife into alcohol. To prevent your object from becoming displaced, it should be previously immersed in alcohol for some minutes to dry the surface thoroughly.

The imbedding in gum requires a little more care; if your object has been in alcohol, it should be transferred for six hours into distilled water, and from there to the gum solution where it should be left for another six hours, as if any water remains in the specimen spiculæ of ice will form, and are very liable to injure your sections.

I use a Cathcart microtome, and freeze with the ether spray, but imagine that the instruments which permit of the cooling influence of pounded ice and salt are preferable.

A fairly large quantity of gum should be placed on the plate of the microtome, and cooled till nearly frozen; then your tooth should be placed in position and continue the spray till the gum is solid, when it will be found to cut like cheese. No previous wetting of the knife is required, as the thawing of the gum will keep it sufficiently moist. The sections should be placed in weak methylated spirit, which will not only remove all the gum, but also any bubbles that may be present. If your tissue is very soft, and liable to be disturbed by washing, it should be transferred from the knife to a slide, and treated *in situ* with dilute spirit. These sections may be stained with carmine or chloride of gold, and mounted in glycerine jelly or Canada balsam.

A second method that I find is very strongly recommended, but of which I have no personal experience, is the use of a saturated solution of picric or carbazotic acid; the tendency to produce shrivelling is not so great as that exercised by chromic acid, and although it stains the tissues much in the same manner, the discolouration is more easily removed by alcohol or water. A third method that I have tried, with but very poor results, is the use of a saturated solution of alum with the addition of half-a-drachm of hydrochloric acid to the ounce.

A fourth method, recommended by Dr. Beale, is to soften the tooth by prolonged maceration in glycerine, to which a few drops of acetic acid may be added to hasten the process.

I will now pass on to the consideration of the third division of my paper, and I know of no readier method than that recommended by Dr. Beale.

He first crushes a newly-extracted tooth in a vice or under a hammer, and selects several pieces of the dentine with portions of the pulp adhering to them—these he immerses in the carmine fluid, and covering over with paper, to exclude all dust, leaves in a warm room for a couple of days. At the end of that period the fluid is poured off, and the specimens washed in a solution made up of strong glycerine two parts, distilled water one part, and are left to soak for a couple of hours. In order to enable the soft tissues to regain their original volume, they should be transferred to a solution made up of five drops of acetic acid to one ounce of strong glycerine, and must remain in this fluid for four days. To facilitate the study of the nerve fibrils, the pieces should now be transferred to one ounce of the glycerine solution of acetic acid, to which enough strong chromic acid must be added to render the infusion of a pale straw colour—leave them for a week, and then imbed in gum, and cut as many sections as may be desirable

These must now be examined in strong glycerine under a low power (1 inch) and the best sections, mounted in glycerine containing two drops of acetic acid to the ounce, will readily admit of examination by higher powers. If you desire to keep any of these sections, the superfluous fluid is absorbed by small pieces of blotting paper, and the glass cover cemented to the slide by carefully painting a thin ring of Bell's Microscopic or Swift's white cement round it, waiting till the first coating is dry, and then repeating a second and a third time ; by this means the section ought to last for years.

If it is desired to study the blood-vessels of the pulp, the animal chosen should be chloroformed, and just before respiration ceases, the right auricle should be opened and the vessels allowed to empty themselves, then should be injected, by means of a syringe, with the Prussian blue injecting fluid previously warmed to a temperature of 40°C. This pre-heating is indispensable, not only to render the gelatine in the solution liquid, but also to prevent the vascular spasm which a cold fluid is very liable to produce. It is then necessary to place the head in alcohol for 24 hours to consolidate the injection quickly, when the pulp is removed, immersed in a weak solution of chromic acid, and at the end of ten days sections of it may be readily cut, and are best mounted in glycerine jelly.

If the animal is dead you must wait until the rigor mortis has passed off, when the Prussian blue fluid can be injected as before, but this time you must use a fluid prepared without gelatine. The first method, however, gives a better result. In some animals that have died of strangulation, the vessels will be found so gorged with blood as to render any further preparation unnecessary.

CLASS IV.—SECTIONS OF TOOTH GERMS.

For this purpose you should endeavour to obtain possession of a very young fœtus, and for the earlier stages those varying in length from three to eight inches will be found the best. Avoid all that have been kept in spirit, especially if weak, or the epithelium will have peeled off, and the jaws be useless for our purpose.

Remove the head and place it in a very weak solution of chromic acid ($\frac{1}{4}$ per cent.), leave for eight or ten days when it should be removed to alcohol to absorb any water. Now imbed in gum, and after freezing and cutting, the sections may be stained with carmine and mounted in Canada balsam to render them translucent. If not stained they will be found opaque from the use of chromic acid and alcohol, and to render them transparent they should be allowed to soak in oil of cloves.

As most of the sections in this class are obtained from the jaws of newly born kittens and puppies, the maceration in chromic acid must be much longer, and may even be extended to a couple of months, but this period may be shortened by the judicious use of occasional drops of nitric acid.

It was my intention to conclude this paper with a few general remarks on the use of the microscope, but the time at my disposal having already elapsed, I can only thank you for the kind hearing you have accorded me.

British Journal of Dental Science.

LONDON, APRIL 1, 1886.

THE LAYING OF THE FOUNDATION STONE OF THE NEW EXAMINATION HALL UPON THE THAMES EMBANKMENT.

Her Majesty could hardly have paid a more gracious or well-timed compliment to the professions of Surgery and Medicine, than by personally taking an active part in the ceremony of March 24th. As our readers will be aware the Royal Colleges of Surgeons and Physicians, members of both of which corporations are among our own ranks, have completed a conjoint scheme for examining medical students, who are desirous of qualifying. To meet the increased demand upon the room allotted to examination, it was determined to build upon some suitable site an examination hall, which might be employed by the two corporations in carrying out their conjoint scheme of examination. The munificence of an individual having furnished the means, it was not long before an architect was found equal to the task. Her Majesty by her gracious consent to officiate at the laying of the foundation stone, has lent greater weight and imparted a more wide interest to an occasion in itself of the first importance to Surgeons and Physicians. Of the ceremony itself, we need say little, but we cannot refrain from pointing out the especial interest and importance it represents for us as members of the dental department of surgical practice. As licentiates in dentistry of the Royal College of Surgeons of England, have at present no incorporation with the members and fellows of the College, yet they take a keen interest in the welfare of the College, and look forward to no very distant date, when they shall hold a more fully recognised position in the councils of that body, and shall be in some way represented upon its councils. But even when we refrain from counting such unhatched chickens we find dentistry comprising within its register very many members of the College, and we are more than sure that such will become more and more common as time goes on. These members and fellows will justly take an interest of no slight description in the welfare of the College, and will watch with enthusiasm all steps intended to further its prosperity. The amalgamation of the examination of the twin Colleges reminds us of another fact of peculiar interest to us dentists. It is, that dentistry cannot be fully understood, nor adequately practised, until the medical aspects of the subject be learned and fully apprehended. Of course, a full curriculum of technical medical study is, by no means, necessary for the average dentist, but it is needful that our students should have *some* rudimentary grounding in the matter. When we look back upon the changes effected in the examinations in surgery, at the College of Surgeons, we learn that surgeons recognise that subjects not purely surgical, form nevertheless, an essential part of any adequate examination for a dental diploma. And as it is for the surgical, so, we opine, will it be for the dental diploma before very long. The standard of every pass examination is certainly set by the class of men who present themselves to undergo its ordeal. So that with the increasing zeal and energy which the London dental teaching schools show, and the higher class of students which such advantages naturally attract, we feel confident that the dental curriculum and "final" must, before so very long, undergo changes. It would be a very questionable policy to increase the severity of the test, change, if change there be, would suggest itself rather in the direction of amplitude of scope, and comprehensiveness of design.

DEATH FROM HYDROPHOBIA.—M. Pasteur's life work is one which will bring him posthumous honours even in spite of the fulsome flattery which has been heaped upon his devoted head. He announced his belief that he could cure hydrophobia and lo, the world has sent him cases to cure. A case dies and his enemies decry him as a failure. Of course some cases die, M. Pasteur can no more save every case than he can jump from Calais to Dover, that he can save one case is marvellous. That he fails in one instance is what all reasoning men will preceive is inevitable, indeed, such an event is the exception which proves the rule. And the case which died came late under treatment and occurred in an unfavourable subject.

Bites, Scratches, Tears, inoculations from carious diseased human teeth are not exactly what one would deem likely to produce hydrophobia, but severe septicæmic symptoms, certainly in some cases, follow their infliction. Dentists who have to treat foul jagged teeth should remember this and act with due caution. Even the saliva of human beings when the buccal cavity is the seat of diseased conditions has been found to be highly poisonous and capable of exciting the most virulent septicæmic in mice.

The Use of Perchloride of Mercury (corrosive sublimate), of the strength of 1 in 2000, should be matter of routine in the surgery, and the dentist will do well to accustom himself to wiping his hands in the solution after attending any cases when they appear at all likely to be infective.

Is dentistry a blessing? Oliver Wendell Holmes, speaking at a meeting of the New York Odontological Society, said, he could hardly picture the sufferings older humanity must have gone through in the preluminous days of dentistry Dentists are certainly social deliverers, 'dear Papa' becomes less gouty, less dyspeptic, and *less cross* after a satisfactory number of sittings with his dentist. The politician, the statesmam are alike able to continue their labours far into the edentulous age of life, the ready skill of the dentist replacing the ravages of time. Whatever an unappreciative world may say of dentists, their work certainly bears leaf, flower, and fruit,which burst forth in the end, and show how far-reaching is the range of usefulness to which the dentist may justly lay claim.

Dr. Taft and the International Medical Congress.—Dr. Taft, the president of the Oral section of the forthcoming Congress, has written to some of the American journals signifying his belief in the *bona fides* of, and his entire faith in the section at the head of which he has been placed.

After-Treatment Subsequent to Excision.—Some intelligent papers upon this most important subject are appearing in a contemporary. The theme is so pregnant of interest and at the same time of such vital consequence that it is surprising so little is to be found in our literature which bears directly upon the subject. It is true that antiseptics in connection with the treatment of unhealthy mouth conditions have been the subject of careful study by Miller, Harlan. and others, but the dangers incident upon the careless after treatment of extraction have been but scantily and insufficiently handled.

A very successful reunion of the present students of the Dental Hospital of London recently took place. The "Smoking Concert" in question was we understand conspicuously well carried out, and meet with the most lively expressions of the audience's approbation.

Abstracts of British & Foreign Journals.

THE INDEPENDENT PRACTITIONER.

FURTHER EVIDENCES OF PREHISTORIC DENTISTRY.

By J. G. Van Marter, A.B., D.D.S., Rome, Italy.

In the library of the Barberini Palace, in Rome, most carefully guarded by lock and key and screw, Dr. Van Marter found a specimen of what was stated to be Etruscan teeth filled with gold. Viewed under glass, this case might easily deceive the unprofessional eye, for it was thickly covered with the debris of ages. Careful examination showed to be four natural teeth—two superior central incisors, lateral and cuspid—banded together with pure gold bands, and attached to adjoining teeth precisely like those previously described. This case belongs to the same period as those found at Corneto, and in workmanship was so nearly identical that it might have been made by the same dentist. It was taken from an Etruscan tomb at Palestrini, near Rome, with numerous fine specimens of gold and bronze-work. As a specimen of early tooth filling, this case is an utter failure, for the gold was *on* and *around*, and not in the teeth.

The most careful search failed to show traces of dental work.

Looking carefully through the jaws he noticed a tendency to deficiency of the third molars. It is worthy of note that, in the comparatively few remains of prehistoric skulls, there should be such a proportion of those in which the third molar does not appear. About one-fourth of the third molars were wanting.

In one case there were the remains of a mother and child lying side by side. The child had the first set of teeth complete, but there was a decided malarticulation. Whether this malformation of the inferior maxillary existed prior to death, or whether the slow accumulation of the debris of ages, or filling in of the tomb, has crowded the lower maxilla into the present malposition, is not certain. Probably there was a malformation of the inferior maxilla prior to death. The mother, lying by the side of her child, had evidently in life lost all the inferior teeth except the two cuspids, and the alveolar process had absorbed away, and looked precisely as we see such cases nowadays, where the poor unfortunate has worn a plate to supply the defect. In this case the superior maxillary and teeth were wanting. In none of the teeth could he discover any appearance of caries. All the teeth that were in the skulls, or parts of the skulls, were sound, and splendid in form and size. Judging from the case of the mother above described, some of the missing teeth in some of the skulls may have been extracted to relieve pain, for want of proper treatment.

By the side of these Etruscan remains lie one Umbrian skeleton and ten skulls. The teeth in these skulls were very fine. Although these Umbrians preceded the Etruscan race, their heads were of the same type and size, with nothing particular to remark about them.

In the Bologna collection there is an Egyptian mummy, in which the superior left central and lateral incisors were decayed away, and the right central about half broken down with caries. Evidently *some* Egyptians were acquainted with caries and grief. There were also numerous specimens of early Gallic teeth in this museum, from the Province of Succa, in various stages of malformation, decay and irregularity.

The most recently opened and the oldest Etruscan tomb yet discovered in Italy was lately excavated at Capadimonti, near the Lake of Bolsena. The entire contents of this tomb, including three teeth bound together with a band of pure gold, gold spiral rings for the side hair, silver finger ring, necklace of amber and glass, arm band, bronzes, vases, etc., etc. The part of this find of interest to our profession is the three teeth. This tomb belongs to the VIth Century, B.C.

The manner of banding the teeth together is more primitive than the Corneto dental specimen, and marks a distinctly earlier stage of pre-Roman dentistry. There is nothing to indicate that these three teeth were attached to any adjoining teeth, and we are left to conjecture whether they were loose natural teeth, supported by the gold band, or if the cuspid were transplanted and held in position by the gold band around the lateral and bicuspid. Possibly the cuspid may have been a transplanted tooth, for we are sure that in those early days they had very clever surgeons. Certainly the spaces between these teeth are wide enough to satisfy the most rabid dental separatists, and the position of the teeth does not indicate that perfect regularity and symmetry were the invariable rule, even in those early days.

M. Ernest Renan, says as follows :

"But that which was most interesting was the upper portion of a woman's jaw, showing the two superior cuspids and four incisors, united by a gold thread. Two of these incisors seemed to have belonged to another person, and to have been placed here in order to replace the missing ones. This piece, which was found in one of the most ancient vaults, proves that the art of dentistry was pretty far advanced at Sidon, and also proves that the earth scurvy (*scorbut de terre*), so commonly seen nowadays in Sidon, existed already in those ancient times."

Gold was probably largely used in dentistry as it is mentioned in a law dated 447 B.C., which says, "If anyone's teeth have been bound together with gold, it shall not be unlawful to bury him with it.

ON CERTAIN FERMENTATIVE PROCESSES IN THE ALIMENTARY CANAL AND THE MICRO-ORGANISMS BY WHICH THEY ARE PRODUCED.

By Professor Dr. Miller, Berlin.

Second Part.

He enquires at what stage of digestion, or at what percentage of acid in the contents of the stomach does fermentation cease? How much of a given antiseptic—salicylic acid, etc., must be given to prevent abnormal fermentation of the stomach?

To answer these queries he experiments as follows :—Meat and bread were chewed up, and a small quantity of sugar with sufficient milk added to make a thick paste. This was infected with three kinds of stomach fungi, which are characterised by the large quantities of gas that they produce, and an equal quantity of four per cent. peptone-sugar-gelatine added. After an hour in the incubator, it was divided into a number of portions of 20 cc. each. To each of these portions hydrochloric acid was added in increasing quantities, so that the first received four parts of H. cl. to 10,000, and the last two to 1,000. The portions being kept at 20° C. soon solidified, and after eight to twelve hours, in all the tubes where fermentation took place an elevation of the surface of the gelatine was observed, due to the formation of bubbles of gas, and in those tubes containing the smallest quantity of H. cl. the mixture was in part driven quite out of the tube. When the H. cl. reached 1.6 to 1,000 the surface of the mixture remained at a constant level, *i.e.*, the fermentation ceased. Salicylic acid effected the same in the proportion of 0.4 to 1,000. In a food mixture to prevent fermentation, or to arrest it 1.6 grams H. cl., or 0.4 grams salicylic acid to each 1,000 grams of the mixture must be added.

He further investigated the action of fungi on carbohydrates, particularly their acid-producing power, with a view of finding out the sources of the acids found in the human mouth. For this purpose they were cultivated in beef-extracts, sugar solutions, in peptone-sugar solutions and in milk. Sixteen of the mouth fungi produced an acid reaction, four an alkaline, and five gave inconstant results. The corresponding numbers for the stomach fungi were nine, two and two; for the fungi of the intestines, six, five and three. The proportion of the acid-forming fungi in the mouth and stomach is, according to these results, much greater than in the intestines. Whether this condition is constant or not, could be determined only by a large number of series of experiments. The cultures in sterilized milk gave results slightly different from the above. No sharp line could be drawn between those fungi which produced an acid, and those which produced an alkaline reaction, the reaction in some cases being slight and inconstant while in others it was altered by a change in the amount of sugar present. One bacillus, tested in reference to this question, cultivated in three per cent. beef-extract solution, left the reaction neutral when one-tenth per cent. sugar was present; the amount of sugar being increased, the reaction became acid; when diminished, the reaction became alkaline.

No sharp line can be drawn between putrefactive or fermentative organisms, since many ferment organisms are capable of decomposing albuminous substances with development of putrefactive products, while on the other hand many organisms which pass as putrefactive, when brought into saccharine solutions give rise to fermentation without giving a trace of putrefaction products. One of the mouth-fungi examined in reference to this question, readily dissolved 1stly. coagulated albumen with development of bad smelling gases, among which SH_2 (Sulphuretted hydrogen) and NH_3 (Ammonia) could be easily detected. 2ndly. it converted cane sugar into Dextrose and Levulose. 3rdly. it split fermentable sugars into lactic acid, with production of CO_2 (Carbon dioxide.) 4thly. it gave an acid reaction in a solution of starch, while the solution reduced the oxide of copper; this fungus showed a diastatic action. In open decomposition very various products are found, it would appear that these are due possibly to several various fungi but hardly that each product has a correlation fungus.

The determination of acid lactic in the alimentary canal was made in part by analysis, in part by crystallization of the zinc salt, and in part by the colour test,* as shown by Dr. Miller and others, very many fungi are capable of producing lactic acid fermentation, such action not being depending on any one specific fungus.

Microscopically, these different fermentations show very great differences, particularly as to the amount of gas produced. Very often lactic acid fermentation takes place without the production of a trace of gas, whereas some of the fungi now under consideration produce very large quantities of gas (CO_2 and H), so that the gelatine in the culture tubes is torn in all directions, and frequently a part of it is driven out of the tube, or the culture vessel ruptured by the pressure of the gas. This copious development of gas can only be accounted for by supposing that it is not a pure lactic acid fermentation a supposition which was confirmed by the analysis which showed the presence of other acids. During the fermentation of half a litre of a beef-extract-sugar solution 250 cc. of gas (CO_3 and H) in three hours were connecsed.

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* One drop chloride of iron, two drops carbolic acid, ten cc. water—violet colour, which becomes yellow on adding lactic acid.

He refers to five gas forming fungi which regularly form large gas bubbles in the gelatine or tear it in pieces. One of these fungi, which in albuminous substances also produces considerable quantities of gas (SH_2 and NH_3) was found in the fæces as well as in a gangrenous tooth pulp. Its presence in the latter place explains the manner in which dental abscesses may often be formed. If a tooth with a necrosed pulp is filled without previously removing the pulp and sterilizing and filling the root canal, the gas which is formed may make its way through the foramen at the end of the root, or drive particles of the decomposing pulp through with it. The irritation thereby produced gives rise (in most cases immediately) to an inflammation of the pericementum. In such cases it was usual to drill a vent in the root to allow the gases to escape.

Three of the other four gas-forming fungi were found in the stomach, and one in the fæces. By far the greater number of the different species examined possess a peptonizing action. In some cases the albumen became completely liquefied by the action of the fungi. Whether the fungi form more peptone than they need for their own nourishment, and whether and to what extent they may thereby be of use to the human body, is at present unsettled. In a large quantity of sterilized white of egg infected with a comma bacillus, he found traces of peptone at the end of the third day. Very few of the fungi here treated possess any marked diastatic action. One out of nine species did so.

The following conclusions may be drawn from the experiments described above :

(1.) A large number of the fungi of the ailmentary canal are not restricted to one portion of it alone, but may develop either in the mouth, stomach or intestines.

(2.) In by far the greater number of cases the gastric juice will not prevent the entrance of fungi into the intestines. All fungi examined may pass the stomach without losing the power of development, provided they are swallowed at the beginning of a meal. If, on the other hand, digestion is at its most active stage (two to three hours after the beginning of a meal), then those more sensitive to the action of acids will be destroyed before they reach the intestines.

(3.) Lactic acid fermentation may continue in the stomach until the percentage of H. cl. reaches 1.6 to 1,000. If too little H. cl. is secreted, or too much food taken at once, the fermentation may become permanent. Diseases of the stomach, general disorders of health, fever, etc., accelerate the fermentation by interfering with the normal secretion of gastric juice.

(4.) Fermentation in the stomach may be more readily arrested with salicylic than with hydrochloric acid.

(5.) A large number of the fungi of the alimentary canal cause lactic acid fermentation in solutions of carbo-hydrates, whereby the frequent appearance of lactic acid may be accounted for. Other ferment acids, acetic, butyric have been observed less frequently and in smaller quantities.

(6.) Five of the species examined caused fermentation with formation of large quantities of gas, chiefly CO_2 and H.

(7.) It is impossible to make an exact division between those fungi which produce an acid and those which produce an alkaline reaction in a given solution; also between ferment and putrefactive fungi.

(8.) The majority of the fungi examined manifested a peptonizing, very few adiastatic action.

(*To be concluded.*)

Literary Notices and Selections.

DEATHS FROM ANÆSTHETICS IN 1885.

By Ernest H. Jacob, M.A., M.D.

Assistant-Physician to the General Infirmary, Leeds.

The following deaths occurring during narcosis by various anæsthetic agents have been recorded during the past year, or have otherwise come to my knowledge. With the view of estimating the number of administrations covered by this list, I am glad to say that, through the courtesy of the registrars and anæsthetists of St. Bartholomew's, St.

Thomas's, and the London Hospitals, the General Infirmary at Leeds, and the Royal Infirmary, Liverpool, all accidents which have occurred in these institutions are recorded, so that I include no small proportion of the surgical centres of England.

1. Salford Infirmary. Boy, Necrosis of leg.

2. Glasgow Western Infirmary. Girl, Dressing stump. Respiration ceased. *Post mortem* : Extensive thrombosis of venous system.

3. Northallerton Hospital. Female, 57 ; Removal of tumour. After 90 minutes, sat up, became convulsed, and fell back unconscious. Breathing went on 20 minutes, but no pulse. No *post mortem* examination.

4. Birmingham Workhouse. Male, 40 ; Innominate aneurysm. Urgent dyspnœa on lying down, and stoppage of respiration after a few inhalations. Pulse beat for 10 minutes after. *Post mortem* : Large aneurysm of innominate.

5. Guy's Hospital. Male, 24 ; Dislocation of humerus. Syncope. *Post mortem* : Slight disease of large vessels.

6. Middlesex Hospital. Female, 53. *Post mortem* : Enlargement of heart and liver, and disease of other organs.

7. Langley Moor. Male, 28 ; Paraphimosis. No *post mortem* examination.

8. Newcastle Infirmary. Male, 53 ; Cancer of tongue. Syncope at end of operation.

9. Glasgow Royal Infirmary. Male, 45 ; Ligature of femoral. Syncope at end of operation on giving a little additional chloroform. *Post mortem :* Heart diseased ; aneurysm of mitral valve.

10. Charing Cross Hospital. Female, 9 ; Inserting drainage-tube in hip. Syncope. Patient greatly emaciated ; lungs congested.

11. Newcastle. Young man. Syncope after partial recovery of consciousness. No *post mortem* examination.

12. London Hospital. Male, 56 ; Removal of tumour of upper jaw. Became cyanosed early, pulse stopped just as operation was completed. *Post mortem :* Some fibroid degeneration of heart, and congestion of bases of lungs.

The list of deaths occuring during the administration of ether includes at least one remarkable case, which I will give in greater detail.

Case 1.—This occurred in the London Hospital. The patient, a man, aged 62, was narcotised in order to reduce a dislocated shoulder. He partially recovered, but the bag (Ormsby's inhaler) was again put on his face. In three minutes he began to look pale, his breathing was feeble; dusky pallor increased, in spite of artificial respiration.

At the *post mortem* examination, the lungs were emphysematous and congested, and there was bronchitis. The heart was flaccid and fatty, with adherent pericardium.

Case 2.—This case occurred in the practice of the Leeds Dispensary. A man, aged 58, suffering from empyema, took ether in order to have the pleura incised. For about seventeen minutes he breathed well, and was of good colour. The ether was then discontinued, as the narcosis was sufficient, and no more was given. About fifteen minutes afterwards, the pulse and breathing began to fail. He seemed to die in a sort of syncope. No *post mortem* examination was allowed.

Case 3.—A girl, age 10, much emaciated, and looking very ill, was brought to a surgeon to be sounded for a calculus. When she had taken but a few inhalations, she was observed to be very pale, the pulse ceased, the breathing continued. The usual remedies—artificial respiration, galvanism, injections of brandy, etc.—were tried in vain. The girl appeared to be suffering from tubercular disease of the kidney, but there was no *post mortem* examination.

This completes the list of casualities under ether, a very satisfactorily small record, considering the general use of ether in our large surgical centres.

The first case is one of a large number, where the narcotisation and a small operation form the "last straw" to overweight a damaged heart and lungs.

No. 2 is difficult to explain, as at least fifteen minutes had elapsed since the patient had had any ether, which he had apparently taken very well. He was weak and emaciated, but able to walk.

No. 3 is the most remarkable case of the kind I have ever known. The patient took not more than a drachm of ether, and died in a precisely similar manner to that which generally obtains in the case of chloroform. The only case I can recall in any way resembling it is one reported some years ago, where a woman, about to have her breast removed for malignant disease, took three or four inspirations of ether from a frame-inhaler, became white in the face, and died. The question may be raised, whether this was not a death in which fright or emotion played the principal part. It is difficult to conceive that a drachm of ether can be, under any circumstances, a fatal poison.

There have been no deaths recorded from the so-called methylene bichloride, or from mixtures of chloroform and ether, during the past year.

In conclusion, I wish to say a word on the question of publishing deaths of this kind. A gentleman holding the office of anæsthetist to a large hospital, to whom I wrote for information, expressed to me, most courteously indeed, his conviction that to publish deaths from anæsthetics was a "most pernicious custom," tending to bring trouble on young practitioners, in whose practice these accidents usually occurred. I cannot see that this need be, if no names or localities be mentioned in the report, and the details of the death be only published. Considering we are still in search of a perfect anæsthetic, it is of great consequence that all details of fatal cases should be made known; and I should be glad to publish in my yearly list such cases as are sent to me, in such a way as to avoid the recognition of the case by the public who may read the medical journals.—*The British Medical Association Journal.*

HISTORICAL REMINISCENCES.

By C. S. Chittenden, D.D.S., L.D.S., Hamilton, Ont.

Fifty years ago, as I was walking down St. Paul Street, Burlington, Vermont, with my father, I read on a door-plate, "O. H. Saxton, Dentist." I asked what the word "dentist" meant, when my father replied: "It means a man who treats people's teeth. It is a very lucrative business, I understand," and this led me to inquire further, as to the meaning of the word lucrative.

I was then ten years of age, and had never heard of a dentist. Two years later, in 1837, I came west to visit my older brothers, one of whom, Dr. Nelson Chittenden, then of Nunda, N. Y., I found to be a dentist. I saw him cut up calves' teeth, for insercion in the mouths of his patients. I well remember how ghastly the calves' jaws looked to me. He also carved teeth from the hippopotamus tusk, and fastened them in the mouth with gold wires passing through the artificial teeth aud around the natural ones, and thus they were tolerably well fixed in the mouth. I remember his showing my father some mineral teeth, which he thought might possibly supplant those made from the teeth of animals. Nine more years passed, when I found myself again with my brother. I was then twenty-one years old, and was starting out in life. My brother, who was nineteen years my senior, advised me to study dentistry. I accepted his advice, and commenced.

I said "study" dentistry, but there was really so little to study that, practically, it meant watching him in the operating-room and the laboratory, and receive his oral instructions. Thirty-nine years have passed since then, during which time I have heard many lectures, read many volumes, attended many dental meetings, where I have heard the best dentists in the country describe their operations, but I have seen or heard of few who performed in the mouth or in the laboratory more conscientiously or successfully than he. If he were not certain of success he refused to act at all. The only book he had for me to study was Harris' Practice, then about one-fourth its present size. He was anxious to keep abreast of the times, but there was very little to keep abreast of, as we look at the profession now. He had a set of forceps made, I think, by Bushnell, of Rochester, which were certainly strong, and able to resist any amount of force. I once asked him why he never used these forceps for extracting, when he told me that unless the teeth were very strong and solid the forceps would crush them. The turnkey was his favourite instrument, and he certainly could use it most effectually. It mattered not which, he could extract with it any tooth that could be extracted at all.

I was taught never to use amalgam, and did not till I had been in practice for quite a number of years. Gold and tin foils were the only materials employed at that time, so far as I know, for filling teeth. These were rolled into ropes, one end turned on itself, forced into a retaining point and fixed. Then another loop or turn on itself was forced down beside the first, and so on till the cavity was filled, when the whole surface would be condensed, smoothed and burnished. I doubt if I could make a good filling in that way now, but I did then, and many of the fillings of those days preserved the teeth as effectually as our more scientifically inserted ones do now. A half-dozen cherry headed drills, as many hatchet-shaped excavators, three or four incisor and as many molar files, with a half-dozen queer shaped filling instruments, completed the outfit for the operative department. No napkins were needed, as while it was considered rather desirable, it was not thought necessary to keep a cavity dry while filling. I remember hearing Dr. Westcott, of Syracuse, say that he had frequently seen the late Dr. C. A. Harris fill teeth without the slightest attempt to exclude the saliva.

In the mechanical department the first requisite was a pair of rollers, or as our English friends call them, "flatters," three or four impression cups (for wax only), with a plate-punch, one or two pairs of pliers for holding gold while filling, a pair of scissors, with lead and tin for swages, and the office was complete. A lathe was a superfluity in those days. A small grinding-stone (such as is used for sharpening knives) sufficed for grinding teeth, the polishing of plates being done by hand, with pencils and sticks dipped in oil and emery. The fee for an upper or lower set of teeth on gold was fifty dollars ; on silver, half that sum. So far as I can remember, the above were the fees among all the dentists for mechanical work. For filling with gold, seventy-five cents ;

tin or amalgam, thirty-seven and a half cents. I have no doubt that much higher fees were charged in large towns, but I am not certain.

There was but one dental college in the world at that time, and but one dental paper, viz., *The American Journal of Dental Science.* This was published regularly. Dr. E. Parmly published a paper which, so far as I can remember, was, issued "from occasionally to semi-occasionally." I think it was called *The Dental Intelligencer.* I have before me the first number of the *New Dental Recorder*, dated Sept. 1st, 1846. There is no name attached to it as editor or publisher, but I think Dr. C. C. Allen acted as the former, for I find his name as such in subsequent numbers. It can easily be imagined how eagerly I devoured each number as it appeared, and with what delight I read "Maury's Dental Surgery,', and another by Paul B. Goddard, which I had obtained before the end of 1847. When I look over these old journals and see such names as Geo. E. Hawes, J. F. B. Flagg, Amos Westcott, W. H. Dwinelle, John Burdell, E. Parmly, E. Townsend, James Taylor, C. A. Harris, J. D. White, John Allen, E. J. Dunning, Robt. Arthur, S. P. Miller, P. B. Goddard, T. L. Buckingham, and a host of others, I feel that I am in the sere and yellow leaf. All these men did good work, not only for their patients, but for us who are alive and remain. "There were giants in those days."

On the first of September, 1847, *The Dental News Letter*, published by Jones & White, appeared. It was a newsy, spicy journal, and reads well even now. It was continued through twelve volumes, when it was succeeded by *The Dental Cosmos*, in 1859. In 1847, our old friends, Drs. Taft and Watt, commenced *The Dental Register* (I am not quite certain that Messrs. Taft and Watt were the original editors). This journal has always done most useful work. I am delighted to know that both of these gentlemen are still in the flesh, but sorry to hear that Dr. Watt is disabled from active duty.

Many other journals sprang up and ran a short course, but as they were mostly published in the interest of some man or clique who had a whimsey to air, they lived through but few numbers.

In returning to my own personal recollections, I may say that I returned to Vermont and entered the office of Dr. Marcellus Newton, of Moutpelier, in the autumn of 1847. He was one of the best manipulators of soft foil that I have ever met. I found him to be a kind, patient gentleman, who did all in his power to advance me in the knowledge of my profession, and in 1848 offered me a partnership, which I accepted, but before articles were drawn I received so great an injury to one of my feet that I was disabled from attending to business for a good many months. In 1849 I was urged by a friend to settle in Hamilton, Ont., where I have remained ever since.

I at once took possession of the office which had been occupied by the late Dr. Alvan Blakesley, of Utica, and more recently by Dr. E. S. Holmes, now of Grand Rapids, Michigan. Each of these gentlemen left a good name behind him, and for years I met evidences of their skill as dentists. Dr. Blakesley was a most excellent operative dentist, with very marked individuality about him. On commencing practice in Hamilton, I met the first amalgam fillings I had ever seen. Frequently persons wearing eight or ten amalgam fillings, all as black as could well be, would call on me for more of the same kind, but I had been too scrupulously trained to avoid all compounds containing mercury, as rank poison, to be wiling to use it at all, and years passed before I could overcome my scruples. My patients were largely from the old country, where gold was, at that time, almost never employed for tooth filling; where "amalgam was the best of anything," etc., etc.; and so—well—you know it is said that—

"Vice is a monster of so frightful mein
As to be hated needs but to be seen;
Yet seen too oft, familiar with her face,
We first endure, then pity, then embrace."

—And so I fell. I have used it ever since, but conscience gives me an occasional twinge yet. I hope my son will live to see something better substituted for it.

In 1852, a Mr. Trendelmberg, of Williamsburg, introduced a preparation consisting of equal parts of calcined bone, sulphur and fieldspar, pulverized, for filling teeth. The sulphur was melted and the other ingredients stirred in till the compound was sufficiently consistent. It was called "Stone Filling." As might be expected, it died in infancy.

In 1851, Dr. John Allen promulgated his system or process of mounting teeth on a platinum base. Dr. William M. Hunter invented a somewhat similar process, both having continuous gums, and a war of words was carried on for a long time. In the end Allen succeeded, and no one appears to have heard of Hunter's process for years.

To be continued.

PERIOSTEUM GRAFTING.

Reproduction of Two and Three-fourths Inches of the Cavicle in the Human Subject by Grafting with Periosteum and with Thin Laminæ of Bone, Covered by its Periosteum, taken from the Dog.

[This Selection although dealing with a matter not strictly "Dental" yet is of great interest in connection with re-plantation of teeth, and the kindred subject of replacing lost portions of bony tissue of the jaws.—Ed. *B.J.D.S.*]

J. F. W., a vigorous, healthy man, aged twenty-two, while bending forward dragging a gun—muzzle foremost—from under the deck of a boat, received the whole charge in the left clavicular region. About three and one-half to four inches of the central portion of the clavicle and an extensive mass of the adjacent soft tissue were shot away, and the vertebral portion of the first rib comminuted, the charge being lodged between the scapula and the ribs.

Two days thereafter, and as soon as shock was fairly recovered from, assisted by Drs. John M. Haden and Charles Ganahl, I exposed the dorsum scapulæ by a free crucial incision, trephined the bone with a one and one-fourth inch trephine, and removed sixty-four shot, three wads, fragments of clothing, and numerous spiculæ of bone.

Appreciating the importance and also the difficulties of securing union, osseous or ligamentuous, of the widely separated fractured ends of the clavicle, I made haste to secure fixation of the parts and give support to the badly drooping shoulder, by means of an angular leathern splint, made to embrace the whole arm, with straps passing front and back, and buckled to a padded leather shoulder-cap resting over the opposite shoulder.

Aided by skin-grafting the healing of the wound, except the excavation left by the portion of destroyed clavicle, was accomplished in six or seven weeks ; but on the removal of the support afforded by the leather splint, nine weeks after the injury, the shoulder was found to droop in a most disfiguring manner ; and, by reason of want of fixation of the shoulder, the movements of the arm were seriously impaired.

A thorough examination revealed no evidence whatever of any chance for union of the bone, osseous or ligamentous. I then determined to resort to periosteal grafting. By means of the curved scissors and fuming nitric acid, the new tissue-formation in the tract of the lost bone was removed, and by scraping off the cartilage formed on the ends of the bone an excavation about three-fourths of an inch in depth below the surrounding surfaces, an inch to an inch and one-fourth in width, and measuring two and three-fourths inches between the nearest projections of the ends of the fractured bone was made. To maintain the proper length of the clavicle, a wedge-shaped axillary pad, etc., was applied. Having secured healthy granulations, rendered more vigorous by pencillings with a ten to twenty-grain solution of nitrate of silver, I proceeded to graft the wound with periosteum taken from healthy dogs, chloroformed or killed for the purpose. In case of the animals chloroformed the grafts were obtained from the superficial portions of the long bones of the legs ; the scapulæ from the dog killed furnished the best grafts. I found a short, stout resection knife, curved on the edge at the point, best suited for cutting out grafts, whether of perisoteum alone or combined with laminæ of the subjacent bone, using the curved scissors for smoothly completing their separation. The grafts taken were the size of a large flax-seed, and applied with as little delay as practicable. The entire surface of the excavated wound, and the ends of the fractured bone were set with grafts, placed about three-eighths of an inch apart. After waiting some thirty or forty minutes for the wound to take on the glazed appearance due to the drying of the lpmph on its surface, the grafted surface was covered with perforated oil-silk ; a compress of picked lint, moistened in two per cent. cabolized water, put on, the whole being held in place by adhesive strips.

On the fifth day, when the dressing was removed, about seven or eight out of every ten grafts of the plant were found to be in process of "taking," rather a better result than with human skin grafts.

The behaviour of these periosteal grafts was peculiar. Like the human skin grafts, when applied they promptly adhered like leeches. From the sixth to the tenth or twelfth day—according to the activity of development in the individual graft—the pale red of the periosteal tissue was observed to be giving place to a deeper, brighter red. With the aid of a compound magnifying-glass, minute points of granulations, with their loops of capillaries, could be seen cropping out through and blending with the tissues of the graft. In addition to these developmental changes in the grafts themselves, the surrounding granulations of the wound seemed to take on a marked activity, resulting in rapid envelopment of the grafts ; the granulations of the wound seeming to rise up around and cover in the grafts, ultimately creating little sinus-like openings of communication between the surface of the wound and the grafts in these their sunken nests. After a few days or hours these minute openings closed entirely, leaving only little depressions to mark their site. As soon as the grafts had been thus swallowed up, another grafting of the whole surface was done as before. Three suscessive plants were made in this manner in the course of a month ; cicatrization of the edges of the wound being retarded the meanwhile by cauterization. The excavated wound having at last become fairly filled out with granulations, the surface was skin-grafted with human skin, so as to hasten the healing over, and thus diminish the tendency to contraction of the cicatrical tissues.

Results. — Two months after the periosteum-grafting, examination of the parts revealed the fact that *the two and three-fourths inch gap in clavicle had become filled out* with a tissue possessing the characteristics of bone as to hardness inflexibility, and perfect performance of the function of furnishing support to the heretofore drooping shoulder. As felt, beneath the tegumento-cicatrical covering—the result of the skin-grafting—the surface of the new section of bone was nodulated and rough, like a mass of rapidly developed exostosis. It was wanting in the natural contour of the adjacent portions of the clavicle, being more flattened out in its traverse, and more or less distorted in its long axis. There was no appreciable difference in the length of the two clavicles at this time. A careful measurement, made two years later, showed the bone to be one-fourth of an inch shorter than its mate of the opposite side.

And now the question arises: Was this filling up of the gap clavicle with *osseous* tissue the result of the periosteum-grafting? Might it not have been accomplished by proliferation of scattered fragments of the periosteum, left in *situ* when the bone was shot away; or the result of developmental extension of the ends of the fractured bone? I am firmly convinced that this formation of bone resulted directly from, and could only have been accomplished by, the periosteal grafting done. I recognise the fact that we are rather prone to argue *post hoc ergo procter hoc.* It was evident, however, from the extent and peculiar character of the injury to the soft parts that no portions of periosteum could possibly have been left behind; and from quite extensive observations in this class of injuries, in the Confederate Hospitals in Virginia, and in the late Franco-German Army Service, I am convinced that so extensive a loss of bone could not, unaided, have been restored. Besides, nine weeks had elapsed after the injury, and no effort at bone formation could be discovered when the periosteum-grafting was undertaken.

The above case of grafting was done in 1876. I have deferred from year to year its publication, hoping to have opportunities of making further trials in similar cases, but failed to find suitable cases in individuals possessed of enough good sense and freedom from prejudice to submit to obtaining even valuable healing by means of the transference of needed tissue from the lower animals to their own precious bodies. I set up no claim to originality in the extensively cultivated field of "tissue-grafting." Although I fail to find mention, in the literature accessible to me, of a similar case, doubtless others have done the same, and possibly with equally good results as in my case.

Since writing the above, I have fortunately had the opportunity of examining J. F. W. again. As the result of a severe fall, some months since, a simple fracture of the new-formed sectien of clavicle, with angular union, has occurred. In other respects the bone remains unchanged, except that some contraction in its transverse diameter seems to have taken place since my last examination made about three years ago.—*The New York Medical Review.*

THE AUTOBIOGRAPHY OF A TOOTH.

"Dead men tell no tales"—dead teeth do.

In writing this short sketch of my life, I shall confine myself to the *full* truth, regardless of my feelings, of my owner's, or of any professional attendants'. I shall tell all; I shall speak as freely of the evil and good I have done, as of the evil and good done me. Furthermore, I shall abstain from employing the amusing graces of poetically-licensed invention. Mine is a simple, serious story, and I shall not indulge in humorous exaggeration, for there was nothing funny in my career, as can be attested by my owner.

My name is "Right Upper First Molar." I was born in Missouri, in 1859. I am French by descent, German by parentage, American by birth. Though my owner is of the bilio-lymphatic temperament, I was originally of a good constitution; that is, I am of fine development, and belong to the yellow "quality." My prospects for a long, useful career were most promising, but criminal neglect in my education and want of professional attention, made me a wreck very early in life. However, I must do my owner the justice to say that he now thoroughly appreciates the truth of the saying—"Blessings brighten as they take their flight." Of late years he has spared no pains or expense to prolong my life, and to let my infirmities bear upon me as lightly as possible. He has formed a singularly sincere attachment for me, any I must confess that, for all his abuse of me, I am quiet firmly attached to him.

As intimated above, my early education was sadly neglected. In fact, I had no early education; I was fourteen years old before I became acquainted with a tooth brush! And as for giving me the benefit of professional attention, that never crossed my owner's mind. I must not be understood, however, as blaming my owner for this utter neglect. He was born and brought up in a country village where there were no tooth brushes, and fewer dentists. To be accurate, there *was* one brush in our little town; and well do I remember the smile of mingled contempt and pity that lit up our face, when we saw a certain young man—the dude of the village—engaged in using that brush! We regarded brushing the teeth as an outcropping of urban vanity.

When I was about fourteen years old' my owner was suddenly brought to a realizing sense of the fact that I had some rights he was bound to respect. We were at this time in St. Louis, attending business college. For some years I had noticed that my health was gradually becoming impaired. My owner remained in careless ignorance of my condition, as I kept it to myself. The time arrived, however, when I was forced to make known my trouble. Consumption was fast closing in upon my pulp, and I could hold out no longer.

While at dinner one day, a portion of my grinding surface gave way; but my owner regarded this with contemptuous indifference. I gave him several warning twinges; still no attention. Then I concluded to make it interesting for him. I began regularly to besiege him. This brought the answer. His manner toward me changed wonderfully. No mother could have evinced greater solicitude for her first-born. He made my molar friends on the other side of the house do all the grinding, and asked everybody what was good for me.

Among the many things he did was to treat me—and that right royalty—to whiskey and to chewing-tobacco. He would sit up with me all night; in short, it seemed as if he could not do enough for me. Finally, he made up his mind to take me to a dentist.

We went to Dr. One, in Olive street. Never shall I forget him. He was a young man recently from college. He pointed with pride to a conspicuously-displayed diploma, granted him by one of the Philadelphia dental schools.

The doctor examined me, and said that my pulp was exposed, and must be removed before I could be filled. We told him to do as he thought best.

Dr. One looked at my owner a moment, as much as to say, "Well, I guess you can stand it." He turned to his instrument case and picked up what he called a nerve-barb. He told us to open wide and sit perfectly still—that it would not hurt very much. The doctor then applied the barb, and slowly pushed it up into my palatine root. We squirmed, and the tears rolled down our cheeks, but not a word did we say. We were trying hard to make ourselves believe what the doctor had said—namely, that it would not hurt very much. After despatching the contents of my buccal roots and placing a wad of cotton in me, he informed us that that would do for one sitting. We were quite willing that it should. We went home feeling very much better, but with an experience the remembrance of which will never fade from our memory. At the third visit, I being pronounced cured, I was filled—my roots with cotton, my crown cavity with amalgam.

In 1875, we went to Washington, D. C. Some of my associates having begun to give unmistakable signs of trouble ahead, we were taken with laudable promptness to a dentist on Pennsylvania Avenue.

Dr. Two had no diploma. After attending to the other teeth he examined me, and said that *I had been improperly filled*; that I ought to receive immediate attention. My owner observed that he thought something was not altogether right with me; that once in a while a little pimple would come on the gum, discharge and disappear; but that it never gave any trouble worthy of notice.

Though I did not much relish the idea of being operated on again, my owner was persuaded that something ought to be done. Accordingly, Dr. Two took out Dr. One's filling, and began treating me with tincture of iodine. He applied this medicament to the inside, on cotton-wool tapers; to the outside of the offending root, on cotton-wool wrapped tightly around the end of a nerve instrument, and shoved by way of fistula to the end of the root. This treatment twice a week was kept up for about two months. The dentist tried hard to cure me, but his efforts were ever and anon mocked by the insuppressible pus. When he finally admitted his inability to do me any good, we asked him to fill me and make out his bill.

In 1878, my owner having in the meantime become the pupil of a dentist who had two diplomas—one dental and the other medical—I was again examined. Dr. Three said that *I had been improperly filled.* Accordingly, he took out Dr. Two's filling. He found the cotton in the roots villainously malodorous. He at once began the carbolic acid treatment. In attempting to open the foramen of my palatine root, he pushed a remnant of the nerve through, causing my owner great grief for eight days and nights. During this time we repeatedly asked the doctor to give me the *coup de grace*, but he insisted that we should hold on. By the assiduous application of roasting-hot figs to the palate nearest the end of the troubling root, the tissues became sufficiently relaxed to permit the egress of the pus. In due course of time, the doctor succeeded in reducing this abscess, as well as the one on the buccal root. My roots were now filled with gutta-percha, the larger part of my crown-cavity with amalgam, the remainder with gold.

We, all three, were quite proud of the work, feeling that it would stand for many years. But in less than two years' time, a peculiar blue line, and then a space, began to appear around the gold at the cervico-buccal margin. We called Dr. Three's attention to this condition. He explained that a mistake had been made in filling a part of the cavity with amalgam. He thought, however, that he could "fix" it. That is, by means of celluloid strips unsparingly applied, he endeavoured to "out damned spot!" but it would not out.

In 1882, I began to crumble away around the gold, and presented a very battle-scarred appearance.

In 1883, a classmate of my owner's took out the crown-filling and replaced it with gutta-percha. This having in time yielded to wear, our wife filled me with gutta-percha, capped with amalgam, to serve as a protective grinding surface. Owing to the good lady not having a thorough knowledge of the mechanical principles involved in the retention of a filling, the amalgam cap, after two months' good service, loosened and dropped out. In the meantime, my palatine Vesuvius had again become active.

Toward the close of 1884, a serious accident befel me. As stated above, my crown-filling had come out, and I looked more like a hole than a tooth. My former self was now represented by reduced buccal and palatine walls, and a full distal wall—all dangerously thin. Notwithstanding this weak condition, my owner used me indiscrimately on soft and hard food. One day I encountered a hard crust of bread, and was split! The fracture extended vertically through the middle of the distal wall; running up under the gum about a quarter of an inch, it turned forward across the palatine root, and ended at the mesial aspect of the cervix.

Of course I was at once placed on the retired list. My owner was on the point of having me removed because of offensive partisanship, as the movements of the palatine fragment had begun to irritate the soft tissues, when he thought of Dr. Four. We at once went to the doctor and asked if a Sheffield crown could be engrafted upon me. Dr. Four has a dental diploma. He thought I was an excellent case for a crown. Accordingly, he cut off what was left of me, even with the gum, and fitted to my bi-partite stump-ship a gold crown, porcelain faced. The fittting of the gold band which was forced up the sixth of an inch under the gum, proved in my split condition to be anything but a painless operation. However, we determined to test the virtues of a "Sheffield," at any cost. I was sure I could stand it if my owner could. Before finally adjusting the crown, the doctor examined the palatine root, and said *that it had been improperly filled*. He therefore removed the gutta-percha and drove into the canal a taper of orange-wood soaked in carbolic acid. I then received my crown, which was truly a thing of beauty and utility.

Unfortunately, a few days after the coronation ceremony, my palatine root once more caused an abscess. Hoping that this might be resolved by Nature's kindliness, we did not immediately go back to Dr. Four. Waiting some weeks in vain for a cure, we concluded to let the doctor treat the abscess. He lanced it freely, and inserted iodine on a cotton tent. This was to remain in until healthy granulation would push it out. The tent was ejected on the following day by pus. My owner, not finding it convenient to see Dr. Four, put into the fistula a plug of cotton soaked in a mixture recommended by Dr. Litch of Philadelphia.

℞. Iodi (crystals).
Acidi carbolici (crystals), aa ʒj.
Alcohol . . . . . . ℥ij. ɱ.

On removing the plug two days afterwards, the doctor found that a healthy growth of new tissues had formed at the bottom of the fistula.

Up to the present time of writing, nearly a year after the the operation, I am perfecty comfortable, and thanks to the skilfully conservative treatment of Dr. Four, am now rendering most excellent service as a grinder. My crown is looking well, and stands service admirably.

The next event in my career, I fear will be the last. My owner thinks I will last three or four years longer, and then I must yield to the forceps. With due deference to his opinion, I cannot help observing that, inasmuch as I have for almost a year done all kinds of dental work, and have suffered no injury, I feel that I am good for six or eight years more. In fact, I feel that I shall remain in office as long as my alveolar constituents will support me.

In conclusion, I will say that though I have been cruelly wronged, I am now at peace with the world. To my owner I have served as an expiatory sacrifice for his neglect; to dental science I serve not only as a warning example of maltreatment, but as an emulable example of dental conservatism. —*L. C. F. H., in Southern Dental Journal.*

Dental News.

THE DENTAL HOSPITAL OF LONDON.

The 28th annual general meeting of this Charity was held last Thursday at the Hospital in Leicester-square. Sir Henry W. Peek, Bt., J.P. (who presided) was supported by Sir Edwin Saunders, Messrs. W. Ash, F. Canton, G. H. Bailey, M. Durlacher, W. F. Forsyth, G. Gregson, David Hepburn, R. Hepburn, S. J. Hutchinson, G. A. Ibbetson (hon. secy.) James Parkinson, H. M. Phillips, T. A. Rogers, S. W. Sibley, Morton Smale (Dean), T. Underwood, and others.

Mr. J. F. Pink (secretary) read the notice summoning the meeting. The committee's report for 1885, which was then taken as read, stated that, notwithstanding the general depression of trade, the past year had conparatively been one of prosperity. The total amount received for the general fund was £1,654 0s. 1d., as against £1,662 0s. 10d.; the donations of life governors, £265, against £325 5s.; the general donations, £119 7s. 9d., against £110 3s. 3d.; and the annual subscriptions, £703 16s., against £673 11s. 6d. in 1884. The latter increase was most satisfactory, being an addition to the reliable income of the Hospital. The amount received from the Hospital Sunday Fund was £68 0 10, and from the Saturday Fund, £32 17s. 10d. Whilst gratified that they had during the year been enabled to reduce the mortgage debt on the Hospital by £500, the committee regretted there was still a deficit of £3,000 in the mortgage debt account, and were reluctantly compelled to make a further special appeal for the funds necessary to pay off this debt, which pressed so heavily on the Charity, and greatly curtailed the benefits it would otherwise be enabled to confer upon the suffering poor.

THE report of the medical committee showed that the total number of operations performed last year was 39,185, being 881 in excess of 1884. The continued increase in the number of patients had made it necessary to provide additional accommodation in the stopping department, and a room had been fitted up for this purpose with the necessary chairs, appliances, &c. This extra accommodation would necessarily prove an additional expense to the Charity. The committee congratulate the governors on having secured the valuable services of Mr. F. Abernethy Burrows, to succeed the Rev. G. B. Twining (resigned) as co-auditor with Mr. G. C. Ash. During the year Mr. Samuel Cartwright, for many years connected with the Hospital, was elected a vice-president, causing a vacancy on the managing committee, to fill which the committee were fortunate in securing the consent of Mr. Cuthbert Peek (son of Sir Henry W. Peek, Bt., an old and liberal supporter of the Charity, and a vice-president). In addition to Mr. Samuel Cartwright, Mr. Gladstone and Mr. Thomas Hyde Hills had during the past year been added to the vice-presidents. The committee desired to place on record their thanks to the auditors and their obligations to the medical officers for their zeal in the performance of their duties, which had tended so much to the usefulness and prosperity of the Hospital during the past year. In conclusion, the committee had the pleasure to express their continued confidence in their secretary (Mr. J. F. Pink), by whose unwearied exertions the Hospital had greatly benefitted.

Mr. G. A. Ibbetson proposed the adoption of the report and accounts, which was seconded by Mr. Hepburn, and agreed to; as was the following, moved by Mr. Phillips: "That the following gentlemen, recommended for re-election by the committee of management—viz., Messrs. W. Ash, M. Durlacher, W. F. Forsyth, G. Lambert, A. Marsh, H. Moon, C. S. Tomes, and A. J. Woodhouse—be re-elected."

Mr. Walter Hills was elected on the committee of management, Mr. R. C. L. Bevan was re-elected as treasurer. The auditors—Messrs. G. C. Ash and F. A. Burrows—were re-elected.

Mr. Underwood proposed, Mr. Parkinson seconded:—That a vote of thanks to the treasurer, chairman, vice-chairman, the committee of management, medical officers, auditors, and hon. secretary.

The Chairman then remarked that he considered the small attendance as a good sign, showing as it did the evident satisfaction of the subscribers with the management of the Charity. Were they not satisfied they would come to the meeting and exercise the privilege of Englishmen--viz., that of complaining. Evidently, therefore, the Institution was managed to the satisfaction of those who took so much interest in it. (Hear, hear.) When asked to take the chair he was rather strange to the work of the Hospital, but having very carefully perused the annual report, he considered it a most satisfactory one. No fewer than 39,000 poor persons had been benefitted in the past year, being an increase of 881 over the number in 1884. He had not the slightest hesitation in saying that the rich equally with the poor benefitted by such an Institution. As one of the governors of Guy's Hospital, he continually saw the great advantage to the community at large of first-rate medical schools. There were many like himself who looked forward to residing in the country and there they felt equally with the poor the great advantage of practitioners who had passed through such a school as theirs. (Hear, hear.) With great gratification he had attended the meeting upon the invitation of his old friend Sir Edwin Saunders. It was one of the pleasures of life to see men who had risen to the very top of their profession devoting their time and their money to the general benefit of mankind. He (the Chairman) was sure that many friends outside were equally with himself very much indebted to Sir Edwin Saunders. (Hear, hear.) One particularly satisfactory part of the report was the improvement in the annual subscriptions which showed a gradual increase. Such subscriptions were the backbone of charities, and whilst enabling their usefulness to be extended, relieved the anxieties of those who were willing to give time to their affairs. Although the progress of this Hospital had been like the growth of a good strong oak-tree—slow and sure—he should like to see it even in a better financial position. One matter which troubled Sir Edwin Saunders and the committee was the probability that the Hospital might, owing to proposed Metropolitan improvements, have to be removed, and so be shorn of its present proportions, convenient position, and invaluable North light. He hoped not ; but if any improvements caused its removal, he trusted that such pressure would be brought to bear upon the Metropolitan Board of Works as to induce them to leave a good frontage site. (Hear, hear.) It appeared to him that there were two classes of the community who ought to support the Dental Hospital—viz., those who had suffered from the teeth, and those who had not. He was one of the former, for he had gone through a martyrdom with his teeth and he was most thankful for the relief from pain which an increased knowledge of the science of dentistry had brought him. (Hear, hear.) His father-in-law was one of the class not troubled with their teeth—for until about 70 they had given him neither ache nor pain, and then began quietly to drop out. Those who knew the sufferings of toothache should do all they could to support an Institution which did so much to relieve the pain of the sufferers from that complaint ; and those who did not know were bound to give a thank-offering to the Hospital for the blessing of freedom from the pain. (Hear, hear.) From the many applications to him for the cards he had to give away he was familiar with the relief which young servants especially had obtained from treatment at the Hospital, and he was being continually and most warmly thanked by them for the relief which they had obtained from the misery caused when the teeth were out of order. (Hear, hear.) The medical committee reported : "The students have worked zealously, and the medical staff have very great pleasure in being able to say that at the autumn examination for the diploma in dental Surgery of the Royal College of Surgeons, 14 students of the London School of Dental Surgery presented themselves for examination, and all were successful." That showed that not only the students were made of the right stuff, but that the instruction they received was of a very high character. (Hear, hear.) Altogether, he had never read a more satisfactory report, and he trusted that for years to come the Dental Hospital of London might continue to fulfil the very useful work it had done so well in the past. (Applause.)

Sir Edwin Saunders, in proposing a vote of thanks to the Chairman, said that they might have wished for a larger audience to have listened to the words of counsel and encouragement just addressed to the meeting. But a small attendance was no new thing, nor was it peculiar to their meetings, for it was difficult to attract large numbers to the annual meetings of institutions well organised and firmly established in public favour. (Hear, hear.) The appreciative words of the Chairman would be a great encouragement to those engaged in carrying out the beneficent operations of the Dental Hospital. (Hear, hear.) He (Sir Edwin) could not forbear to quote a recent utterance of that "old man eloquent," Oliver Wendell Holmes, almost the last survivor of that band of American celebrities which included Emerson, Longfellow, Bryant, Hawthorne, and others equally well known and appreciated on both sides of the Atlantic. Holmes' words were : "I often think of the forlorn condition of the great personages of history in the days when there were no dentists—or none who would be recognised as such by the dental artists of to-day. I think of poor King David, a worn-out man at 70, probably without teeth, certainly without spectacles ; of poor George Washington ; of

Walter Savage Landor, and of his melancholy complant that he did not mind losing his intellectual faculties, but the loss of his teeth he felt to be a great calamity. The dental profession has established and prolonged the reign of beauty. It has added to the charm of social intercourse, and lends perfection to the accents of eloquence. It has taken from old age its most unwelcome feature, and lengthened enjoyable human life far beyond the limit of the years when the toothless and poor blind patriarch might well exclaim, 'I have no pleasure in them!'" (Hear, hear.) Rarely indeed had the value and advantages of their art been more fully and clearly stated, and never had they received more eloquent recognition. (Applause.) If their meetings had not been largely attended, it could not be denied that they had always been pleasant gatherings, for they had been presided over by those who were not only wealthy and what Americans called "prominent citizens," but who were also practical philanthropists who showed sympathy with the work of the Hospital. (Hear, hear.) Thus they had had the experience of their excellent friend and treasurer, Mr. Bevan, so long identified with social, religious, and philanthropic movements; also Sir Charles McGrigor, a staunch friend of the Highland and other Scottish societies; and of Lord Kinnaird, a warm friend and supporter of the Lock Hospital—an Institution which sought to mitigate the ravages of the most dreadful and far-reaching scourge which afflicted humanity. (Hear, hear.) But their present chairman had still stronger claims to the title of practical philanthropist. As the inventor of the school children's penny dinners—which was not only a great boon to the children, but was a most valuable lesson in thrift and the economic use of food—and, further his having come promptly to the aid of the public, pending the slow action of the Corporation in rescuing from the spoiler—the speculative builder—the lovely and romantic country known as Burnham Beeches. (Hear, hear.) Those were real and undeniable public benefits which should not be suffered to pass out of their grateful recollection. And since he (the speaker) came into the room he had had another proof of their friend's great liberality, and the interest he took in the Dental Hospital, for he had already been a most liberal supporter, but he had now given him (Sir Edwin) 100 guineas towards its funds. (Applause.) He asked them to join him in thanking the chairman.

Mr. T. A. Rogers, in seconding the resolution, stated that

Sir Henry Peek had come there at great inconvenience, but he never allowed any inconvenience to interfere with his public duties. After instancing the serious effect upon public men when suffering from the toothache, and of the value of the benefits accorded by that Institution, he submitted the resolution, which was carried unanimously.

The Chairman, in thanking the meeting for the vote, said that he was sorry that he did not know so much of the Hospital as did his son, who was on the committee, and had every disposition to take a great interest in it. (Hear, hear.) He (Sir Henry Peek) did not suppose that any reference would have been made to the penny dinners, but since there had been such an allusion he would like to recommend the consideration of the matter to all present, as from the very nature of their profession they were practical philanthropists. So far the movement had done an immense deal of good to the children, not only physically, and in bringing them up in good habits, but mentally. They were compelled to pay the first thing on the Monday morning; the mothers, mother-like, were anxious to get full value for their money, and the children were by no means indifferent to the advantage of a good hot meal. As to the practical result, he could tell them that that very morning he had received the Government returns, which showed that every one of the children had passed, with a Government grant of more than £1—to be accurate, he believed it was nearly 21s. per head awarded to every child in the school. (Hear, hear.) That was a very great advantage, and they had proved demonstratively by 10 years' experience that a good, wholesome, substantial dinner could be given to every child at a cost for material of less than a penny. And not only that, but it enabled the children easily to pass the Government examinations, with the result that the school-master got a substantial cheque—of course, a very great incentive to him to do his best. (Hear, hear.) Sir Henry concluded by again thanking the assembly for the vote they had passed, and repeated that he hoped the Institution might continue to be as signally beneficial to their suffering fellow-creatures as it had been for so many years past. (Applause.)

VACANCY.

Victoria Dental Hospital.—The post of Dental House Surgeon is vacant. Applications with testimonials are requested to be sent to the Secretary.

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ON THE PHYSIOLOGICAL ACTION OF NITROUS OXIDE.*

> "Quant à l'action anesthésique en elle-même, elle est parfaitement independente de l'asphyxie, et elle se produit par un tout autre mècanisme."—Claude Bernard.

By Dudley Wilmot Buxton, M.D., B.S.Lond., M.R.C.P.
Administrator of Anæsthetics in University College Hospital,
the Hospital for Women, Soho Square, and the
Dental Hospital of London, &c.

Mr. President and Gentlemen,

In reintroducing to the notice of this Society the subject of nitrous oxide gas, I feel some preface is called for, some explanation demanded.

To most members of this Society it will not be difficult to recall the various occasions upon which the subject of nitrous oxide has been brought upon the carpet, and, for the time being, fairly threshed out. The Proceedings of the Odontological Society give evidence of two facts in relation to the subject of my paper: they reveal that the Society at large took a keen interest, an interest which I venture to think has in nowise flagged or grown less real as time has gone on; and then that the members of this Society are, as a rule, experts who speak from the standpoint of experience, and not from hearsay. I shall, with your permission, later on, have to cite the experience and experiments of members of this Society, and shall amply substantiate the truth of my statement that the Odontological Society speaks as a body of experts.

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* A Paper read before the Odontological Society of Great Britain.

I shall not detain you, gentlemen, with expressions of my own unfitness to address you upon a subject with which you are already familiar, because my fitness or unfitness will amply be shown before we part this evening. I will say that I, as a student of the great physiological puzzle, our body, am simply and earnestly seeking for truth. I come here to lay what facts I possess before you, and only desire to go away again with a fresh store of information gathered from my fellow workers in this field.

The subject before us, which is the physiological action of nitrous oxide gas, is one of wider compass than at first reveals itself. The literature devoted to it is abundant, but the results arrived at are not commensurate with the amount of ink spent and paper spoilt. This is not wonderful, since the question is one of extreme difficulty, experimental research undertaken in its elucidation is both arduous and laborious, and so many writers have adopted the easier plan of working up old material which they have garnished with crude criticism. The whole subject is at the present time really confused by conflicting theories and experimental results, which, while presenting a mass of information, are almost irreconcilable. This unsatisfactory state of affairs has prompted me to undertake an attempt to clear up some points, and harmonise some discordant conclusions. The task before me is of course of vast magnitude, and certainly more onerous than I could hope to bring to a satisfactory termination were my temerity such as to make me contemplate the undertaking single-handed. As it is I contemplate a prolonged research, and was therefore most grateful when your courteous Secretary permitted me to lay the matter before you, so enabling me to enlist your sympathies in my work, and to submit to you certain conclusions and facts upon which I might seek the ripened criticism of your prolonged experience and careful personal observation. I confess that I, like Frankenstein, have not a few times shrunk in dread from the monster my hands and brain had fashioned. By a happy thought, however, and a second appeal to Mr. Woodhouse, I was able to quiet my fears. By cutting my monster in pieces he appeared less huge and cumbersome and altogether less formidable. In short I suggested, and my view was kindly fallen in with, that I might first be allowed to bring in review the facts which bear upon the physiological action of nitrous oxide gas, and to indicate how far the conclusions hold from the premises adduced, and how far they correspond with our present experience ; while I should reserve for the present the more strictly experimental part of my research until we had cleared the ground from mere *à priori* reasoning, and had sifted the evidence as at present placed in our hands.

Many of the facts which I propose to bring before you to-night will be familiar to you as facts, although I venture to think their true significance in many cases has been overlooked. This has occurred because there has not been an attempt made to bring them into sequence, and to trace the subtle cord of correlation which subsists between them. It is my aim to attempt so to marshal our facts that we may clearly ascertain their true bearing, and thus be enabled to see what gaps still exist in the chain of evidence.

Nitrous oxide—

(*a*) is said to produce a state which we term *anæsthesia* —a loss of sensation ;
(*b*) it initates certain emotional states, provoking a sensation of exhilaration and well-being—in fact, it plays the *rôle* of a stimulant ;
(*c*) it gives rise to modifications of the respiratory and
(*d*) circulatory systems ;
(*e*) and provokes marked muscular movements, which may be roughly classed as
    (i) rigidity or contracture, and
    (ii) jactitations.

These are, speaking broadly, the effects of nitrous oxide upon the mammalian organism, and in attempting to explain them we must ascertain their relations among themselves. In the first place it is essential that we should assure ourselves whether the conditions of our problem are simple or complex. I propose to show that the latter is the case, and that many of the phenomena attributed to nitrous oxide are, in point of fact, merely accidents of our methods of introducing the gas into the lungs.

The main point of interest in the physiological action of nitrous oxide is the production of anæsthesia. Now this condition, the loss of power of perception of sensation, together with the state of analgesia, or loss of sensation of painful impressions, may arise from want of action of the sensory end-organs, of the conducting sensory nervous fibres, or of the receiving and perceptive centres. These distinctions the pathologist points to as resulting from various neuropathic lesions. We are all aware that local anæsthesia, as it is called, and local analgesia are determinable by such appliations as aconitine, cocaine, cannabis indica, and we are ware that in certain rare cases etherisation will call into being a true analgesia, a condition in which a patient is spelled into a sensationless trance, while he possesses his faculties sufficiently to know what is going on.

That nitrous oxide is neither a true anæsthetic nor a true analgesic is the first proposition I propose to consider. I submit that the evidence goes to show that sensation is retained until the perceptive powers themselves cease to receive. That sensations, whether merely tactile or painful, are not blocked at the end-organ, nor is their progress interfered with along the nerves which connect the sensory end-organs with the spinal cord and brain, and hence the stoppage is carried back to the centres themselves. A further fact is that I have observed, and I believe I am in harmony with most of the authorities upon the subject, that during the stage immediately anterior to the loss of consciousness, persons under the influence of nitrous oxide are *hyperæsthetic*. Now observe the significance of this fact. Under normal conditions, we move our limbs in response to stimuli, and do so in an orderly fashion ; we experience sensations of heat or cold, of touch, light, and so on, without distress, and this is because the complex mechanism of our reflexes—the end-organ and conducting fibres to the nerve centres, the nerve centres themselves, and the efferent fibres thence to the muscles—are all acting harmoniously, and are under the control of the inhibitory centres in the cerebro-spinal axis. When from any cause these inhibitory centres are thrown out of gear we have on the one hand excessive muscular movements, on the other excessive sensory impressions. A whisper becomes magnified to a roar, the fall of a pin assumes the importance of the crack of a whip, and so on. This, then, I venture to submit, shows that, if I am right in stating that nitrous oxide does induce hyperæthesia, the cerebro-spinal axis, at least as far as sensation goes, is the seat of the changes which nitrous oxide induces, and which culminate in the complete abeyance of consciousness. In investigating this fact I would, however, urge your attention to an important caution. The personal equation of sensibility varies within wide limits. So coarse are the senses in many persons—the lympho-phlegmatic—that hyperæsthesia in them scarcely amounts to more than the normal sensibility in the nervous temperament, and so we cannot with propriety reason from their cases. In this connection I would draw your notice to the convenience of grouping the brain phenomena due to nitrous oxide in three periods: the period before unconsciousness, which I contend is the hyperæsthetic period, the period of unconsciousness, and the period of returning consciousness, in which I believe nitrous oxide hallucinations take their origin.

Now if nitrous oxide does indeed effect molecular changes in the brain, a point to which we shall return later, we have yet to examine the means by which this gas enters the system and is enabled to produce its central effects. We are here met by a most comprehensive problem. One of the following conditions presumably constitutes the mechanism for which we are seeking:—

(*a*) The nitrous oxide may either give rise to other bodies by changes in its own chemical form; or

(*b*) Acting purely in a mechanical fashion it may upset the normal equilibrium of the function of respiration, and so give rise to accumulation of aërial fluids in the blood, and which would normally be excreted.

(*c*) It may act *per se* and exercise a specific action just as strychnine or any other body.

We will dispose of these propositions in the order in which they stand. At one period it was believed that nitrous oxide acted as an oxidising agent, by splitting up in the body or tissues into oxygen and a residuum of nitrogen compounds, and hence came into vogue the Apnœal or Hyperoxygenation theory of Colton. In support of this theory, Stillé and Maisch urge that venous blood is arterialised by shaking it with nitrous oxide, and phosphorus burns in it, that seeds germinate under bell–jars of nitrous oxide. Zimmermann, whose paper I have not been able to consult, is pledged by Stillé and Maisch to the statement that pigeons and rabbits will recover after being placed in the gas for eight hours. Of course, were such contentions true, we should have to admit that nitrous oxide is a respirable gas. However, it is difficult to believe any of the assertions when viewed by the light of modern research. For it is well within the memory of this Society that the Committee appointed by it tendered, I believe in the year 1873, their second report, in which is given the results arrived at by Dr. Frankland. This observer came to the conclusion that nitrous oxide was not decomposed during its sojourn in the body, basing his opinion upon analysis made of air expired by rabbits when confined in an atmosphere of mixed air and nitrous oxide. With these analysis I will not detain you. Others, adopting less exact methods, have arrived at the same result, and Coleman pointed out that were oxygen liberated, it would probably produce the most baneful results upon the organism. However, this objection has little weight when we consider that it would be the tissues of the body which would take up the oxygen liberated from the gas and employ it for molecular integration. Jolyet and Blanche, who publish their results in Brown-Séquard's "Archieves de Physiologie," find vegetables as well as animals die incontinently when placed in an atmosphere of nitrous oxide. And I have in the case of certain seeds failed to induce germination in an atmosphere of pure nitrous oxide. Of course combustion will take place in nitrous oxide, provided the heat be sufficient to produce "the mode of motion" in the molecules of the gas which leads to their disintegration; but experiment has shown that the heat of the blood is insufficient to initiate such a dissociation.

But perhaps the most crucial argument adducible in confutation of the hyperoxygenation theory is that apnœal states are by no means necessarily anæsthetic conditions. Bonwill's suggestion of rapid breathing to produce anæsthesia probably acts rather through the changes it produces in the blood pressure of the cerebral circulation or nervous exhaustion, than by dint of hyperoxygenation. But all these observers have apparently overlooked another way in which the nitrous oxide may be introduced into the system, and exist as a quasi-compound in the blood and respiring tissues. We are well aware that carbonic monoxide, hydrocyanic acid, and the nitrites, bodies of especial interest to us at present, are capable of entering into a combination with the colouring matter of the blood, oxyhæmoglobin, and that of the respiring tissues, oxy-myo-hæmatin, and forming more or less stable bodies which are ismorphous and present kindred physical properties. We cannot fail to recognise at least strong chemical bonds of union between nitrous oxide and the nitrites, nor does it appear to me to be a far-fetched hypothesis to suppose that nitrous oxide enters the blood in some such a combination. At the same time I have no actual proofs of what I have suggested, since there is extreme difficulty in eliminating mere asphyxial from nitrous oxide spectrum if such a one exists. Of course when an animal is killed by nitrous oxide, the blood, if examined within two minutes of death, gives the well-known spectrum of reduced hæmoglobin, while the muscles give the corresponding one of the reduced myo-hæmatin. Here we are dealing, not with nitrous oxide blood effects, but these complicated and probably overrdden by asphyxial effects. Later on we shall have to point out a further possible way by which nitrous oxide may be introduced into the organism.

Let us now consider whether nitrous oxide can act simply mechanically by ousting the oxygen from the oxyhæmoglobin and oxy-myo-hæmatin, *in fine* as an indifferent irrespirable gas.

It is conceivable nitrous oxide may act as a simple irrespirable gas in precisely the same way as nitrogen, hydrogen, and so on, or it may decxidise the blood acting as a reducing agent, such as ammonium sulphide ; in either case the end arrived at is the same, viz., asphyxia. It was to this conclusion that Jolyet and Blanche arrived when they wrote, " Le protoxyde d'azote étant un gaz irrespirable et ne possédant les propriétés anesthesiques qu'on lui a attribuées, son emploi ne peut être que dangereux, et doit à ce titre être proscrit de la pratique médicale."

To be continued.

A CONSIDERATION OF THE MERITS AND DEFECTS OF THE VARIOUS METHODS OF PIVOTING.*

By W. Dougan, L.D.S.

Mr. President and Gentlemen,

I propose, this evening, to consider the merits of some of the numerous methods of attaching artificial crowns to the roots of natural teeth, a process not employed by the general dental practitioner to anything like the extent to which it ought to be applied ; and this I think, is not to be wondered at as the manner in which this operation is generally performed is exceedingly unsatisfactory : while when well performed on a sound system few operations will more delight the patient, seeing that these manipulations are performed at a time when all hope of saving the natural teeth has fled and the unfortunate patient thinks himself doomed to wear a plate.

The six upper front teeth, the lower canines, the upper and lower bicuspids are the most favourable for pivoting, and these are the teeth that oftenest require this treatment. The molars when largely filled are but little conspicuous and the lower front teeth seldom decay, and if they do it is at a time of life when all the other teeth are lost and they themselves are loose.

The essentials for a good method of pivoting are that the root shall be permanently protected from decay, that it shall be left reasonably strong, and that the attachments shall be productive of no irritation, while in case of breakage it shall be capable of easy repair.

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*Read before the Manchester Odontological Society, on December 1st, 1885.

Though not absolutely necessary it is extremely expedient that the method should not depend upon the use of special crowns, but shall permit the use of the ordinary plate teeth. This I think everybody will admit seeing that a pivot tooth should match perfectly in colour, shape and size the natural teeth amongst which it is placed, and in this country at the present time and probably for years to come, manufacturers and dealers will not supply any variety of special crowns alleging that there is not sufficient demand to justify them in so doing. Hence the dentist who uses special crowns will after some loss of time generally have to use an unsuitable tooth because it is the best he can procure. Another objection to the use of special crowns is that all which I have seen were weaker than metal backed plate teeth, and in addition their shape and attachment made them large and bulging on the palatal surface, thereby rendering their adjustment with the opposing teeth a matter sometimes of considerable difficulty. These objections do not apply with equal force to bicuspid crowns because a much smaller variety in size and colour will suffice, and also because sometimes we can use no other crowns.

Now all the requirements above mentioned are not satisfied entirely by any one method of pivoting, and we may well employ ourselves in considering the merits and demerits of the principal methods.

1. As the old wooden pivot has be largely used and is still used by some practitioners, we may appropriately begin with it. The method of setting this tooth is so familiar to all that it needs no description from me, its merits are mainly cheapness both in time and material. Its disadvantages are those already enumerated as belonging to special crowns, it fails to protect the root perfectly from decay and the whole operation is weak as compared with some others.

2. The method of pivoting in general use, which consists in employing the usual plate or tube teeth with wire pivot pin wrapped in silk and gum mastic, fails entirely to prevent further decay, and, on the contrary tends rather to pro-

duce it. While most of us have probably seen instances of such pivot teeth which have endured in some cases eighteen or twenty years, the majority last a very short time.

3. The Bonwill method is so well known that a very brief description will suffice. The root canal is drilled out in excess of the size of the pivot pin used, grooved in its sides and the orifice countersunk. The root is filled with soft amalgam into which the flat, saw-edged pivot pin is forced, sufficient being left projecting to enter well into the tooth crown. This latter, which has been previously fitted to the root, is also filled with soft amalgam slipped over the pivot pin, and forced up to its place, thus making one continuous plug of amalgam through crown and root.

4. Dr. Storer How has devised four forms of tooth crowns, viz. :—a four pinned and a twin-stapled crown to be used for front teeth, a hollow all porcelain crown, and a double-faced convertible crown, having a cuspid face on one side, and a lateral on the other. These last two are used principally for bicuspid work. All these varieties of tooth crowns are secured to the root by a special metal screw post. These screw posts are made with a coarse thread, a medium cut between the thread of a screw for wood, and one for metal work. These screw posts are made in three sizes, and are inserted in the following manner:—After the apical third in length of the root canal has been filled, the root face is levelled to the gum, countersunk and grooved in the manner shown in the diagram. The canal is next measured and the special twist drill is inserted in its chuck and allowed to project the measured length of the root canal, which is then drilled out. A special tap, corresponding to the size of the drill used, is set in its chuck to the same length and the root is tapped out. The metal crew post is then screwed home, a post chuck being used to avoid injuring the thread of the post.

The twin stapled or four pinned crown is then slipped over the screw post, which is bent in whatever direction may be necessary to clear the opposing teeth, and adjust the crown in a line with its fellows. When the crown has been fitted satisfactorily the four pins or twin staples, as the case may be, are bent tightly round the screw post, a convenient pair of pliers, and an instrument called a crown mandril being used for the purpose. The operation is completed by packing amalgam, or other stopping, in the grooves of the countersunk root face, around the screw posts and pins, and to the original contour. The hollow all porcelain crowns are secured by filling them with soft amalgam, and screwing them home with a nut working on the end of a screw post.

The Bonwill Foster, or the special crowns manufactured in this country by Lemale, may all be attached to the roots in this way. The How screw posts are, in addition, a most effectual means of securing large amalgam fillings in back teeth.

5. The Buttner method is another modern method possessing many peculiarities. For its performance a special set of instruments is required, consisting of drills, reamers and trephines. The operation consists essentially in turning the end of the root perfectly flat and cylindrical, and is accomplished by the above mentioned instruments, which are worked by the dental engine. The drill is used to enlarge the root canal, the reamer to cut the root-face flat, and the trephine to render the root cylindrical below the edge of the gum, a wire is placed in the root canal and allowed to come through a hole made in the impression cup. The impression is taken, but, before removing it from the mouth, the wire is taken out through the hole in the impression cup and is afterwards replaced in the impression, a brass root model, corresponding in size with the instruments used to prepare the root, is placed on the wire, and the impression cast with it in position. When the model is drawn we place a gold cap on the brass root-model and fit and solder a plate-tooth to it. The finished work is secured by driving it on the prepared end of the root with a mallet. The gold caps are made a little smaller than the prepared ends of the roots, so that they will have to stretch when forced on, and so make a very close joint, which would appear sufficient to prevent further decay.

6. The Richmond crown is made by fitting a gold cap and pin directly to the root, which root is not prepared by special instruments as in the Buttner method. It is secured to the

root by filling the cap with soft white cement, the surplus of which is forced out when the cap is pressed up to its place.

7. Dr. Flagg has devised a ready method of pivoting, briefly described as follows :—Select a plate-tooth, fit it to the root, and bevel it from near the pins to the labio-cervical edge ; solder a platina pin to it as a pivot and backstay combined. Fill the root which is enlarged, open-mouthed and undercut, with amalgam, and let it harden for a day. In the root filling drill a hole larger than the platina pin, as near the palatal portion of the filling as possible, and directed slantwise to the apical portion of the root filling, then fissure-drill the hole towards the labial portion of the filling, trying the tooth until it sets just right, when it is secured by packing amalgam on the root face, and the palatal face of the tooth.

8. Dr. Weston's method is practically the same, but uses a special hollow backed pin tooth, and a special platina pin, and fastens the end of the pivot pin in the root with a little oxyphosphate, afterwards packing gold or amalgam into the enlarged root canal, and on the palatal face of the tooth.

9. The late Dr. M. H. Webb described a method of pivoting which is for all practical purposes like Dr. Weston's ; but Dr. Webb used plain plate teeth, and always built the pivot into the root with cohesive gold, and contoured the palatal surface with the same.

10. But the method of pivoting which has proved most satisfactory to me consists in fixing a platina tube in the root, and mounting a pivot tooth on that. The tubes and instruments which you see before you are manufactured by Messrs. C. Ash and Sons, from patterns designed by Mr. Balkwill.

As success in mounting pivot teeth depends greatly upon accuracy in details, I will describe to you the method which I have myself found most satisfactory.

The first step is to destroy the pulp if it is not already dead. This is accomplished by exposing it and applying arsenious acid, which I allow to remain in contact with the pulp about three weeks, at the end of which time the pulp may be removed painlessly, and without bleeding. If the pulp is already dead the root canal is cleared and treated with antiseptics in the usual manner. When the parts are restored to health, the apical portion of the root canal is filled with gutta percha. A pointed roll of gutta percha is prepared. The pulp canal is filled with chloroform carried there on wool loosely rolled round a nerve bridle, when the wool is withdrawn the cold pointed gutta percha is immediately carried to the end of the canal and gently packed there. There always remains sufficient chloroform in the canal to effectually soften the gutta percha, and ensure a close fit. Some care is necessary, as it is sometimes easy to force the gutta percha through the apical foramen.

It is most important in this and every other method of pivoting that the apical foramen be closed before any attempt at drilling out the root be made, as otherwise a ledge will be formed, beyond which it will be impossible to carry the filling material, and failure will be the inevitable result.

Generally the root canal will be filled before the crown will be cut off. This is accomplished by nipping off the crown, if frail, bit by bit. Should the operator cut the crown off *en masse*, he ought always first to cut a groove on the labial and palatal surfaces with a small circular saw.

The crown being removed the pulp canal is drilled out, the face of the root is countersunk, and grooved in the manner shown in the diagram.

The canal is now tapped out with a tap corresponding to the drill used, the groove is cut in the root to make the tube additionally secure, as the thread cut on the tubes supplied by Messrs. Ash is extremely fine and more suitable for holding in metal than in a comparatively soft material like dentine. It would be better if the tubes were fitted with a course thread like the How screw, but when the root has been prepared in the manner described the tubes can be made secure.

The root canal being tapped and cleared from the dèbris the tube screw is now tried, to see if it goes nicely up to its place ; if it does it is taken out and the tube just allowed to enter the root, the countersunk root is now filled with soft amalgam and the tube screwed home, excess is cleared away and the amalgam allowed to set. If the details have been properly carried out the tube will be fixed immovably, and the root face will be permanently protected from decay. A tube tooth may now be mounted in the usual manner if found suitable. But if the bite is close, or the root not in line with the other teeth, a flat tooth will have to be used, and this should be fitted with a stout backing, covering the entire palatal surface of the tooth and coming well up to the cutting edge. This is done that the opposing teeth may bite on the metal instead of as we often see upon the unprotected mineral.

A piece of extremely thin Platina or Dental Alloy plate is now fitted to the root and a hole made in it for the pivot pin to come through.

I prefer gold wire alloyed with platina for the pivot. The pivot pin is left long to enable the operator readily to withdraw the appliance and it is generally necessary to bend the pivot pin and grind a slot in the mineral tooth at the palato-cervical edge, to render easily adjustable. The tooth, base-plate or cap and pivot pin are fastened together with a mixture of wax and resin adjusted to the mouth, invested in plaster and soldered. Before placing the finished work in the mouth, a thin disc of soft, warm gutta percha is placed between the cap and the root, and the tooth pressed into position, taken out and excess of gutta percha cleared away. The pivot pin is now barbed or ragged with a sharp knife and forced home, considerable pressure being employed in doing so. It will be found sufficiently firm for all practical purposes, while it can be removed if necessary without much difficulty. This method is applicable to the six upper front teeth, the lower bicuspids, and canines, and sometimes to the second upper bicuspids.

Methods of lining the root with tubes have often been described, some operaters using square pivot pins to prevent lateral movement, but round ones are stronger, more convenient, and abundantly firm. In some cases a bridge may be mounted with these tubes, but only one pin may be soldered to the bridge, since if two or more are attached it will be found impossible to get them into the tubes, as these invariably point in different directions. The rest of the pins for attachment must be headed and passed like nails into the tubes, either through holes prepared for them in metal block teeth in the case of molar or bicuspid, or through holes made in the plate at the back of the front teeth in the case of incisors.

Comparing the respective merits of the methods just described, we find that the Bonwill effectually preserves the root from decay ; the operation is readily performed, requiring but little time. The objectionable features are (1) Weakness of the root by reason of excessive drilling out. (2) The mineral crown is weak and has all the disadvantages already enumerated as pertaining to special crowns.

In the How method the attachment of the screw post to the root is as perfect as any method depending upon a central pivot pin can be, but, as you may see from the specimens before you, the How four-pinned crowns are so exceedingly frail as to be almost useless. Nevertheless the method has great value, for these How screws when fitted with nuts are a most efficient means of fastening the all porcelain crowns, manufactured by Lemale, and these, either for front teeth or bicuspids, are in point of strength very satisfactory. The Buttner method is the strongest ever devised, or possible, for attaching a crown to a root. It is only objectionable because the ferule or cap is considered to irritate the periosteum in addition to robbing the root of a portion of its attachment. All the objections apply equally to the Richmond method which has the further disadvantage of depending on the use of the perishable white cements.

The Flagg, Weston, and Webb methods will all protect the root from decay, but are objectionable because the root canal must be considerably enlarged in order to pack the filling material round the pivot pins, and in all three, should the porcelain break, the operation will have to be repeated *ab initio.*

But of all the methods described none combine so many points ef excellence as the tube and central pivot pin. The root is as perfectly protected from decay as in any other, less substance is removed than in any other method depending on a pivot pin with the exception of the How. While if not so strong as the Buttner or Richmond methods, the method maintains the attachment free from the objection of irritating the periosteum. Plate teeth are used, and can be placed in any required position without regard to the position of the root, and should the porcelain be broken (and when the tooth is properly backed this is less likely than in most methods) its repair is an easy matter.

It has one fault, should the pivot pin break in the tube its removal is difficult, but this objection applies equally to most other methods. Many operators have condemned screws used in dentine, but that is because the screws have been made with too fine a thread, and while the tubes shown you would be better if made with a coarse thread like the How, if the root is prepared in the manner described and shown in the specimens it will be found impossible to remove the tube without cutting it out or breaking the root. There are many other methods of pivoting teeth but none of them are possessed of any special merit, and judging from the past it is probable that many forms of tooth crowns and methods of attachment will yet be devised, but they will better or differ radically from those described in this paper I think most unlikely, inasmuch as there appear to be but two ways possible of securing a crown to a root either with a band or ferule as in the Buttner and Richmond or with a central pivot pin, which may be a screw either hollow or solid as in the How, or simply cemented into an enlarged root canal as in the Bonwill, Webb, Weston and other methods.

DISEASES OF THE ANTRUM.*

By Henry J. Moore.

Mr. President and Gentlemen :—The subject that we have for discussion to-night, cannot fail to be one of importance to us as Dental Surgeons, when we consider the close relationship of the teeth in the superior maxilla, to the cavity in that bone, known as the Antrum of Highmore, and the complications that we may at any time be called upon to treat, by reason of the disease of the one affecting the other.

It would perhaps be as well, at the commencement just to freshen up our recollections of the anatomy of that part, and its surroundings, for the whole region is very interesting, when we get into the domain of surgery, if we have managed to escape with a fair amount of success, the frequent endeavours of trying to remember what the superior maxillary bone does with such a lot of surfaces, borders and processes, as it presents to any one beginning the study of the foundations of anatomy ; although I must acknowledge, that it is equalled, if not surpassed, in this weakness by many of its fellows. For myself, I always find that any piece of anatomy assumes, somehow, a different aspect when looked at in a surgical light. To be as brief as I can, I would remind you, that the antrum is a large triangular-shaped cavity in the body of the bone, its apex being formed by the molar process, and its base by the outer wall of the nose. Its walls have four aspects, namely, towards the orbit, the nose, the zygomatic fossa, and the face, whilst its floor is formed by the alveolar process. With the exception only of this latter its walls are very thin.

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* A Paper read before the Student Society of the Dental Hospital of London.

The position and size of the opening between the antrum and the nose are points of some importance. The size of the aperture found in a macerated superior maxilla give a very exaggerated idea of the opening in the articulated skull, when it is encroached upon by the palate, inferior turbinate and ethmoid bones, which narrow and sub-divide the opening into two.

In the recent subject these are covered in by the mucous membrane of the nose, so that ordinarily there is only a small oblique aperture left, in front of the unciform process of the ethmoid, and close behind the infundibulum.

It should be observed that this opening is at the upper part of, and not near the floor of the antrum, and that it opens into the middle meatus of the nose.

Another fact that we must not forget, is the frequent occurence of thin plates of bone extending across its interior, which sub-divide the cavity, these being very variable in size, shape and position. Deep pockets too are often formed in various parts, particularly at the anterior and posterior corners of the floor, and by their retention of any fluid, that is doing harm in the antrum, they are liable to be a source of annoyance and trouble in the treatment.

The position that the sinus occupies in relation to the teeth cannot be laid down in hard and fast rules, for in one case all the teeth from the wisdom to the canine may encroach upon it, and, in another, only half that number, but those to which it is most constant are the first and second molars.

It might perhaps have been better for the antrum if it had not remained so constant to the first molar, at least in civilised countries, for I believe that that tooth is the source of a good percentage of its abscesses, on account of its liability to decay, and so to cause suppuration, this decay being favoured by the fact, that a large number of persons contrive to look upon it as a temporary tooth, and allow it to proceed till it is past repair.

Suppuration in the Antrum, or as it is generally called abscess of the Antrum, arises probably in two distinct ways. In one case it is due to inflammation of the lining membrane of the cavity, which being continuous with the mucous membrane of the nose allows of the escape of the contained purulent fluid into the middle meatus by the natural orifice. In other cases, the pus is contained in a sac, which has expanded into the antral cavity, carrying the lining membrane before it, and then the pus does not find exit by the nasal opening. The latter condition is much more common than the other, on account of the frequency of alveolar abscess being the cause of trouble in the sinus.

Antral abscess may also result from inflammation extending from the teeth to the lining membrane, for the roots of those that are in relation to the cavity often have only a thin plate of bone covering them, which can easily become affected when the teeth decay.

In some few cases, especially those of a mild character, the affection appears to arise from catarrhal inflammation. It has been excited by the entrance of foreign bodies after the extraction of a tooth communicating with the cavity, and also by a violent blow on the face.

It is not confined to any age, but is, however, most frequently met with in middle-aged persons of weak or strumous constitutions.

The symptoms are very varied. When the lining membrane is inflamed, there is dull, deep-seated pain shooting up the face and to the forehead, with a sense of weight and fulness in the side affected. Occasionally the pain is most acute, and of a sharp stabbing character. The cheek is swollen, red, and tender to the touch. There is also some fever and constitutional disturbance. A slight rigor may accompany the formation of matter, which sometimes finds its way into the nose, when the patient is lying on his sound side.

When it is unable to escape into the middle meatus, the antrum becomes distended and the teeth appear to lengthen unless an opening is made, either by the absorption of some part of the bone or by the surgeon.

If the abscess is not acute, the patient may notice pus when he blows his nose, without having had any violent pain, or the discharge may find its way into his throat, when lying down, causing a disagreeable taste in the mouth, especially in the morning.

All the pus cannot be emptied out this way on account of the position of the opening into the nose, and by its continual presence, the patient very often complains of an offensive smell, which is not perceived by his friends. Sometimes the pain, mostly dull, is referred to the teeth and the most careful examination may fail to detect any cause in any one of them, whilst he himself is unable to single out a special offender. In these cases the trouble has been put down to neuralgia, and after trying all known remedies unsuccessfully, the last attempt has been the extraction of useful teeth, many of them being lost unless it should fortunately happen that the tooth which has caused the mischief should be extracted early, when the discharge at once clears up the nature of the case.

The more ordinary consequence of an unrecognized abscess is the damage it does to the digestive organs from the swallowing of pus during sleep. The patient is always unwell, with a poor appetite and may be reduced to a state of great weakness, being very little benefitted by the medicines given for indigestion.

In exceptional cases the pus cannot find an exit before it has done a great amount of harm to the surrounding parts. This it does by expanding the antrum, causing partial absorption of its walls and so encroaching on the nostril of the affected side and bulging out the cheek, and perhaps, thrusting up the floor of the orbit. When the accumulation has reached as far as this, of course it cannot fail to affect the eye, and in severe cases the sight may be temporarily lost by the stretching of the optic nerve. It may, however, lead to permanent blindness from the inflammation extending backwards so as to involve the motor and optic nerves where they enter the orbit, but this is of very rare occurrence. It is certainly satisfactory to know that all these advanced cases are by no means as common as they were at the commencement of this century, and we cannot but acknowledge that this improvement is due to those who have laboured to raise the Dental Profession to its present position, by endeavouring to teach its members at least some of the laws of surgery, and by leaving behind a much better class of instruments than they found when first commencing practice.

Besides decreasing in severity there has been a great diminution in number, and I believe that this is the result of the more skilful extraction of teeth, still by saying this I do not presume to judge any preceding race of dentists, even although they took up the extraction of teeth as a diversion from the more serious occupation of a barber or blacksmith, for we now sometimes find it no easy task to get out the fangs of an upper molar, and therefore cannot wonder at their refusing to relieve patients of troublesome stumps with the then existing instruments. If these advanced cases are left to themselves the pus is sure to escape somewhere, and according to Hunter, the most likely place is through the cheek. It may burst into the nose or burrow round the fang of a tooth and so get into the mouth. Sometimes the floor of the orbit gives way and then the discharge takes place at some point along the lower eyelid.

It will be seen from the preceding remarks, that the diagnosis of antral abscess is often very difficult, and therefore we ought to be on our guard against hasty conclusions.

It can be confounded with other affections of this region, such as mucous polypi and dentigerous cysts, and with some of the symptoms of the earlier stages of malignant disease. Chronic abscess may also be confounded with a slow growing tumour, but this is not likely to occur if the walls have been thinned by the progress of the swelling, as evidence of fluid fluctuation can then be obtained. An inquiry into the history of the case may often assist us, and in any case of doubt, that may have a dental origin, an opening should be made with a small trocar before a more serious operation is commenced.

In the treatment of these cases of course the first thing to do is to find out if possible the cause of the mischief, and if it should be a tooth, to remove it, for by so doing you provide an easy place of puncturing the antrum. It is of the highest importance that this should be done without delay. At the same time any bone that is found necrosed in or beneath the floor of the antrum should share a similar fate.

There can be no doubt that the practice of refusing to operate for the extraction of teeth, while the swelling or inflammation continued, has been the cause of a great number of the most severe cases, and patients have been left to suffer for weeks, even if not for life, from the effects of such injurious surgery.

If the cause is removed in time before pus is actually formed, the inflammation may subside under hot fomentations, and the application of leeches to the gum. Purgatives should also be given. But if pus is shut up in the cavity, these measures will not be sufficient.

In many cases the course of action is decided for us by the discharge of matter following the extraction. When this happens the best plan of treatment is to enlarge the opening in the socket, by the introduction of a trocar or small trephine, always taking care to guard your instrument from slipping, in the same way as you do when using the elevator.

Should no tooth require extraction, an opening can be made into the antrum just above the first molar tooth. Mr. Christopher Heath mentions that he much prefers this way of treatment, unless it is really necessary to extract, first, because the aperture is not so liable to close up, when made through the alveolus, and next, because food is less likely to get in.

In treating these cases it is best to have an opening of fair size, in order to surmount any difficulties that may arise from the peculiarities of the cavity, for it is most essential to success, that the removal of pus shall be perfect, and that the injections shall reach every part. It should be first thoroughly washed out with warm water, and whatever means may be adopted for obtaining drainage, it is most important, that the cavity should be well cleansed every time before applying any injection, as long as pus remains. A weak solution of permanganate of potash is very useful, and should be used every day. If the mucous membrane requires stimulating, chloride or sulphate of zinc, or nitrate of silver can be used also weak, but these cases are generally very tedious, and often take many months for their cure.

Mr. Morton Smale has lately recorded the treatment of three cases, in which he obtained a much quicker cure by using a 10 per. cent. solution of carbolic acid to syringe out the cavity with, and then by plugging it with a 25 per cent. solution of the same, leaving it in for 24 hours. This was repeated for several days, until the antrum was perfectly sweet, and then for about a month after, the cavity was syringed out every other day with the 10 per cent. solution. In two of the cases the opening was closed in by a plate and in the other cotton wool and gum mastic was used.

The closing in of the aperture, in some way or other, is always necessary, in ordar to avoid the access of food, and also to provide some means of keeping it patent. Mr. Coleman suggests that a small metal plate should be made just to cover over the wound, being fastened by bands to the nearest teeth, and to this a gold or platinum tube, about $\frac{1}{10}$ of an inch in diameter should be soldered, which passes through the plate and into the antrum.

When the discharge has ceased, and further treatment is unnecessary, this plate can still be of use during the healing of the opening, if the tube is removed and a small piece of metal soldered over the hole.

CYSTIC DISEASE OF THE ANTRUM.

Simple cystic tumours are perhaps the next most common cause of trouble in the sinus, and may either originate entirely within the antrum, or may secondarily involve that cavity by their continuous growth, when they arise from any of the surrounding parts, such as the teeth.

Those arising within the antrum occur as a single growth, or as a collection of smaller cysts, and appear to be due to the dilatation of one or more of the mucous follicles of the lining membrane, by a clear but viscid fluid, which often becomes flaky. In these cases the cysts very often do not cause any inconvenience, and they may exist many years before their presence is even suspected, especially if they do not attain to a large size, but if they become inflamed from any cause, we may have just the same symptoms as those of antral abscess, and if the inflammation does not subside, their contents may become purulent.

Those arising from the teeth are divided into two classes :—1st. Cysts connected with the roots of fully developed teeth, and these may be called Periosteal Cysts, 2ndly, cysts connected with developing teeth, or with teeth retained within the substance of the jaw, these being named Dentigerous Cysts.

Periosteal cysts are formed most probably from the same causes that produce alveolar abscess, only, the morbid process being less acute, a serous fluid is poured out instead of pus ; and they generally affect the antrum by absorbing some part of its floor or of one of its walls by their continual pressure, and then expanding into it. Like the other cysts they give very little pain in their growth, which is very slow compared with an abscess, and they may at last reach to so large a size as to completely fill the sinus.

In some cases after they have made an opening into the antrum, the envelope of the cyst bursts, and the fluid being still secreted, is poured out into that cavity until, at last, it is distended, and its outer wall becomes so thin as to crackle like parchment, whilst evidence of fluid fluctuation can be obtained. This condition may also be brought about without the rupture of the sac, and also by other cysts of this region

If the cavity is tapped with a trocar a quantity of clear or yellowish serous fluid is drawn off.

When a patient formerly presented himself to be treated for this affection, the symptoms were generally said to be due to "Dropsy of the Antrum," and the old explanation of all this was, that the natural secretion of the lining membrane had become imprisoned by the closing of the aperture between the nose and the antrum. In order to effect a cure for these cases, the plan of trying to re-establish the communication by the introduction of a hollow sound into the antrum through the nose was recommended.

It is now doubted whether there is such a disease as "Dropsy of the Antrum," for in most cases, if not in all of those cases, that have been put down to it, the contained fluid in no respect resembled ordinary mucus, but was rather like that thrown out by serous cysts, and even when the secretion was found to have a mucous character, it might have been produced by a mucous cyst.

Dentigerous cysts may also produce swellings in this part which give rise to symptoms that are much the same as those caused by other cysts, but it is well to remember their possible occurrence in treating any fluid tumours that are found in the antrum, for if we do not extract the teeth that they contain we can hardly hope for success, as the cause of the secretion still remains to baffle us.

It is well in any suspected case to examine the teeth, in order to find out whether any are missing, for although cases are on record in which these cysts contained temporary or supernumary teeth, they generally exist round permanent ones, and occur mostly in young adults. On the other hand we must not suppose that because a tooth is not cut it is retained in the jaw, for it may be wanting altogether, being lost, as some say, by the advancement of civilization, and in fact pointing to that happy time when man shall be relieved from the troubles of dentition.

It is sometimes very difficult to diagnose those cases from innocent solid tumours, for they both often have strong points of resemblance, and mistakes are on record, in which the treatment of the cysts has been that of the solid growth, namely, excision of part of the jaw, resulting of course in great deformity, which would have been avoided if the disease had been more easily recognised.

When they find their way into the antrum most generally the only symptom that is troublesome is the persistent swelling increasing very slowly, and causing inconvenience, not only from its size, but also from the knowledge that it is there, for patients often worry over this fact alone.

The treatment of these cases of cystic disease very much resembles that pursued when we have an antral abscess to deal with, therefore the first step is to remove, if possible, the exciting cause.

When the cyst arises from the mucous membrane of the antrum we may not be able to do this on account of our inability to trace the affection to any particular tooth, and then of course we must open the antrum inside the mouth, somewhere above the molar or bicuspid teeth, the exact place being chosen where the bone is thinnest. After allowing all the fluid to escape, the opening should be enlarged, in order to prevent further accumulation, which would take place if it closed too readily. Stimulating injections should also be used in the same manner as an abscess.

For those cases in which the antrum is crowded with numerous cysts, Mr. Heath considers that no treatment short of excision of the maxilla can be of any use, but these cases are very rare, and when present do not grow as quickly as single cysts.

If the cause of distension is a periosteal cyst we may be fortunate enough as to bring it away when extracting the root to which it belongs, and in order to do this, we may have to exercise great care, so as not to tear it off, and leave it in the antrum ; for its entire removal of course means that scarcely any treatment is needed.

When the cysts remains after the extraction, we can treat it in the same manner as the last, only, it is well to introduce a drainage tube into the sac through the empty socket.

Mr. Coleman suggests, that the cyst should be made to suppurate after it is emptied, in order to prevent any further secretion, as he considers this likely to happen if only stimulating lotions are used. To accomplish this he packs the cavity with lint moistened with carbolic acid, and leaves it in till it has produced the desired result, but never longer than 24 hours.

In all obscure cases we should not forget the possible presence of teeth in the sac, and if we obtain evidence of any, they should be extracted, even although this may prove an operation of great difficulty ; but they may not be discovered when first sought for, and so if the case does not progress favourably, a second search should be made.

I would here mention, that the contents of a dentigerous cyst may suppurate, and so in rare cases while we think we are dealing with a plain antral abscess the affection may be complicated by the continual irritation of foreign bodies in the sinus.

It is not my intention to-night to touch at all fully on the other tumours of the antrum even although they may be of interest to us, on account of, amongst other things, the possible influence of diseased teeth on their formation and growth, for their treatment lies entirely outside our province, requiring, as they too often do, severe surgical operations.

In any case of doubt it would be, I think, advisable to see the patient with a surgeon even before resorting to the final test of exploring the swelling with a trocar, for should the growth be malignant we may increase its activity and afford it the means of escape from the antrum, which should be avoided, as, after this has happened, the success of the removal is much less favourable than when it is enclosed entirely by bony walls.

The forms of malignant disease most frequently found in the antrum spread rapidly into the surrounding structures, and generally at an early period into the nose often leading to the suspicion that the patient is suffering from a nasal polypus. They also secondarily affect the lymphatic glands under the lower jaw, and too frequently occur at an early period after removal. The age of the patient is not a sure guide, still they have most frequently passed middle life.

Mr. Heath has recorded two cases of epithelioma of the antrum in which dentists were consulted first. In one case an upper molar that was loose was extracted, bringing away a soft growth attached to its fangs. There was a good deal of discharge and the case for a short time was considered to be an abscess, being treated as such, but before a month has passed its more serious characted was recognized. This patient's age was 66, and he died within a year of the first appearance of the disease, having been operated on.

A great variety of innocent tumours affect this cavity, the commonest being perhaps, purely fibrous, the growth of which is generally slow. It expands the walls of the antrum, forming tumours on the face, and in fact consisting of a great number of lobes that pass into all the spaces communicating with the sinus, which if not removed may increase to an enormous size. Suppuration may occur in these tumours, when they have been punctured, to see if they contained fluid, and so they should be speedily operated on after this has been done. This removal is said to be always a perfect success provided none of the original growth is allowed to remain.

I will not weary you with details of any other tumour, or rare affection of this part but only hope that I have afforded you enough substance for a good and useful discussion.

OBJECTIONS TO THE EXTRACTION OF THE FIRST PERMANENT MOLARS.

Dr. Haskell communicates the following objections to the Journal of the Ohio State.

One objection to the extraction of the first permanent molars, is to be found in the position in which it leaves the remaining molars, in their relation to artificial teeth which may eventually be worn on the upper jaw.

These remaining teeth are so often pitched forward, at an angle which makes an inclined plane, as to render them useless, because if they meet the artificial teeth, the constant tendency is to crowd the plate forward and so displace it.

Many a set is thus rendered very troublesome until the posterior teeth are ground so that they no longer meet.

British Journal of Dental Science.

LONDON, APRIL 15, 1886.

METALLO-THERAPY.

One of the strangest departures in therapeutics which has been advanced within the last few decades is metallo-therapy. Although applied by but few physicians this line of treatment has led to striking cures even when all other resources of therapeutics had failed. In the hands of some of the most highly esteemed practitioners in Paris and elsewhere metallo-therapy has achieved great triumphs and has shown itself to be well worthy of closer enquiry and experimental trial. The gist of metallo-therapy may be said to be in the fact that certain individuals evince a susceptibility to the influence of some one metal, and by a simple trial, such as we shall illustrate later on, the metal being discovered the after treatment consists simply in the adoption of some preparation of the metal in question. In some cases of nervous disorder when sensation in the limbs was much interfered with, bands of various metals were successively applied until one was found which relieved the pain or restored functional activity to the affected member. In all cases a profound effect was found to follow the application of some variety of metal. The nature of the material employed was kept from the patient. Now if we observe such marked effects follow the use of metallo-therapy when applied to the limbs one is naturally inclined to inquire whether the application of metals in the process of filling may not also produce effects at present unlooked for and so passed over unobserved. The objection which will of course be raised will be that the conditions in the two cases are so very different. That on the one hand you are dealing with a highly vascular soft tissue well supplied with nerves, while on the other you are working with bone from which the nervous pulp may even be removed. Now such objections are invalid since as far as we have gone we none of us know how or through what tissues your circle of metal does its work. Nor does theory appear very far fetched when it assumes that the very intimate connection subsisting between the metal filling and the tooth is really so strong as to allow the metal *quâ* its metality to act not only locally but remotely, that is after the manner of metallo-therapy.

In the case of metal work we find very many patients who if not quite hystero-epileptics are at least highly neurotic and it is such persons whom Budot and other physicians have found susceptible to the remedial action of metallo-therapy. These persons, were the extension as real as it is enticing would not only reap the benefit of the ordinary stopping as a filling but would also find relief from the many ailments grouped under the head of neuralgic affections. And then what cases, it will be asked, are suitable for the trial of metallo-therapy? If any, surely those of highly nervous impressionable persons who even when all diseased dental states have been duly dealt with and when no general or constitutional causes exist, yet are tormented by neuralgic twinges flying about the face and head, pains which have persisted in spite of all the ordinary methods of treatment.

It must be distinctly understood that we in no way bind ourselves to faith in metallo-therapy. We simply throw out the suggestion to our seaders for what it is worth and shall be glad to hear whether the cases treated by its aid really do well. Of course the application of metallo-therapy as far as dentists are concerned must be restricted within rather narrow limits since it can only be employed when plates or extensive fillings are required, and again even then only when the metal selected in the ordinary way is one which lends itself to dental manipulation.

Like mesmerism, hypnotism and clairvoyance, metallo-therapy has had its traducers who have gone so far as to term the system pure humbug. From such a charge however the researches of Charcot, Boucharat, Budot and others should redeem it at least as far as the cases of hystero-epilepsy go. Whether or not an extension in the direction which we have indicated will lead to benefit must remain for further proof.

Upon the first blush we are inclined to believe some exceptional cases might and would derive benefit from its use. Exceptional cases need exceptional treatment. For the rest we must adopt a purely unbiassed aspect and wait for further evidence.

WE understand that a student of the London Dental Hospital has gone to Paris to consult M. Pasteur, having had the ill luck to be bitten by a rabid dog. The gentleman gallantly undertook to destroy the animal, which threatened to work terrible havoc in the restaurant of a large London hotel. All will trust this daring act of unselfishness will involve no serious consequences upon the brave perpetrator.

A propos. M. Pasteur has been prosecuted for practising the healing art without being duly qualified. The great man has got out of his difficulty by signifying that the truly medical work of his laboratory is done, not by himself, but by a duly qualified medical practitioner.

Mr. William Savory who, as president of the Royal College of Surgeons, was presented to Her gracious Majesty, on the occasion of the laying the foundation stone of the new Examination Hall of the College of Physicians and Surgeons, has been offered and has declined a Knighthood.

THE appointment of a Dental Surgeon to the Scarborough Hospital has ended in a way which, to the unassisted eye of outsiders, seems strange. Mr. Walshaw, doubtless a most highly competent and skilled practitioner, defeats a gentleman who holds the L.D.S. of the English College. As pointed out by a correspondent of the *Scarbrough Mercury,* Mr. Ashby the unsuccessful candidate, sent in testimonials from well-known London dentists whereas his successful opponent holds no diploma and offered only testimonials from local practitioners. We repeat we are not behind the scenes but it seems "strange, passing strange."

Of course the L.D.S. is not everything and many men in practice before 1878 know their work better than some of their diplomated brethern, but it is absurd to expect men to toil and slave in order to obtain a high-class diploma unless they have some reasonable hope of obtaining hospital posts and taking precedence of men who have not gone through the severe course of study required before the proud day arrives when the *alumus* may write L.D.S. after his name.

"Is there no way of bringing these men within reach of the law?" So writes a correspondent enclosing *a trade circular*, we cannot class it by any other name, issued by a practising dentist in a large provincial city. The culprit seems to be doing a thriving business in cheap teeth, and acting on the principle that if the mountain will not go to Mahomet, the prophet will go to the mountain, this accommodating dealer in cheap dentures goes on the tramp from town to town and makes his ill-gotten gains amid the unwary.

The evil is, unfortunately, more easily seen than cured. The British Dental Association undertakes to prosecute illegal proceedings on the part of Dentists, but advertising, although a sin against the respectable part of the community, is hardly of a nature to warrant a prosecution, as it is at best doubtful whether any benefit would follow such a course, save and except to the lawyers. The best guarantee the profession and the public have against the advertising quacks is that in time the laity will acquire the knowledge of the superiority of the work done by *bona fide* practitioners. Of course the great power which the advertisers possess, and which they are not slow to call into requisition, is that the public loves "cheese-parings," and so if the dental cheap-jack cries "Here you are, whole sets for a pound! Why pay more?" John Bull blindly runs amuck, has the guinea organs of torture inserted and then groans ever after.

NINTH INTERNATIONAL MEDICAL CONGRESS.

SECTION ON DENTAL AND ORAL SURGERY.

We have pleasure in publishing the following circular from Dr. Taft.

" As there seems to be some misapprehension in the minds of some, and earnest inquiry by others, as to the status of the Section on dental and Oral Surgery, in the International Medical Congress, to be held in Washington, D. C., in 1887, it seems right and proper that some statement be now made in regard to the organization and progress of the work.

It is very generally known that the Section has been established and organized ; the following officers have been appointed, viz : a President, one Vice-President, and two Secretaries.

Fourteen gentlemen of recognized ability and high professional standing, from various parts of the country have accepted positions upon the council, and have pledged themselves to do all they can to make this Section a success. At the next meeting of the Executive Committee, ten or twelve more names will be added to the Council, as may seem best. Much of the preliminary work in arranging the matters of the Section, has been in the main accomplished.

A programme—embracing the subjects of greatest interest to the profession of the world—has been outlined, and is now under consideration ; and as soon as completed, the secretaries will open correspondence with the eminent men of the profession in Europe and America, relative to the work to be done. Quite a number have already indicated a desire to prepare papers, or at least take some part in the work.

We not only expect, but are assured, that this Section will receive the hearty support and co-operation of dental specialists, both at home and abroad ; and with such manifestations, great hope is entertained that the Section will be eminently successful. We ask for it the co-operation of all who have the best interests of our profession at heart.

A circular will ere long be issued by the Executive Committee, giving the status of the preparatory work for the Congress.

J. TAFT, President of Section D.O.S.

Abstracts of British & Foreign Journals.

OHIO STATE JOURNAL OF DENTAL SCIENCE

PYORRHŒA ALVEOLARIS, INFLAMMATORY ALVEOLITIS, PHAGEDENIC PERICEMENTITIS.

By A. W. Harlan, M.D., D.D.S., Chicago.

Symptoms.—Incipient pyorrhœa may be seen after the tenth year. The teeth most frequently affected are the upper incisors, bicuspids, first and second molars; lower molars, second bicuspids and the incisors. Blunting of the septum of gum between the teeth; detatchment of the peridental membrane of the gingival margin, partially or completely encircling the tooth; promotion of a pocket or pockets of varying depths, the gum is reddened, sometime thickened. The alveoli waste on the labial and lingual surfaces of the teeth, deposits of serumal calculi exist on the roots beneath the detached gum, pus exudes on pressure, the teeth become loose and drop out, or become irregular. Salivary calculus may be associated with pyorrhœa alveolaris, it is distinguished from it by the gums bleeding freely when it is removed, and by the quick subsidence of the inflammation and the rapid reattachment of the gums to the teeth.

Etiology and Pathology.—Any injury to the dental ligament, as the extraction of an adjacent tooth, rapid wedging, forcing rubber bands, cloth or ligatures around the teeth, injudicious use of tooth picks, the use of clamps over teeth to retain the rubber dam, salivary deposits (rarely), lack of cleanliness, use of brushes too stiff and not properly constructed, hereditary tendencies, or any inflammation of the gums suffieient to detach the peridental membrane, furnishing,

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Read before the Ohio State Dental Society at Chillicothe, O., Oct. 29, 1885.)

a spot for a *nidus* around which may be deposited serumal or salivary calculus. Some state that pyorrhœa alveolaris is a specific, infectious disease, proliferated by a micrococcus. Sometimes salivary deposits coat some of the teeth, and other teeth in the same mouth, were affected by pyorrhœa.

TREATMENT.—All deposits are removed by thin flat scalers without mutilating the gums ; using a pushing motion : the edges of the alveoli are excised or scraped and the pockets syringed one at a time with peroxide of hydrogen. After which, solutions, in water, of iodide of zinc (grains VI-XII-XXIV), or, a saturated aqueous solution of chinolin tartrate; or carbolic acid crystals 2 parts (oil resorcin) wintergreen 3 parts, oil cinnamon 1 part, are to be injected into the pockets twice a week, to stimulate the formation and growth of new tissue around the roots of the teeth. In case the teeth are very loose or out of line they should be held together with fine binding wire, pending the treatment.

WANT OF ROOM FOR THE ERUPTION OF THE PERMANENT TEETH, ESPECIALLY THE THIRD MOLARS.*

By C. R. BUTLER, M.D., D.D.S., Cleveland, O.

The first molars of the permanent set are generally erupted at six years old, with crowns rather more bulky than those of the preceding molars. And these serve a very important function. Their roots being completely formed before the temporary teeth are shed, they sustain the force of mastication between childhood and youth, thus giving the normal stimulus to the salivary glands. They also prevent pressure upon the but partially developed teeth of replacement. The jaws having sufficiently elongated, these teeth take position just back of the twenty temporary ones.

Within the next six years, the jaws elongate backwards, to make room for the second, and for the third molars.

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* Read before the Ohio State Dental Society, Chillicothe, October, 1885.

The cause of irregularity and crowding is said to be due to the inheritance of all shaped disproportionate jaws and teeth from the parents. The father may have large teeth in a corresponding jaw, and the mother, small ones in a small jaw. The teeth are inherited from the father, and developed in a small jaw derived from the mother.

The limited space between the second molar and the base of the outer, or vertical portion of the ramus, forces the erupting third molar against the lateral ends of a fixed circle. In consequence of the non-appearance of these teeth till the age of eighteen or twenty, or even when they present earlier, the inferior maxillary bone having become well solidified, and the preceding teeth being more or less crowded, serious inflammation is caused.

The removal of the second molar in these cases to give room is deemed bad treatment.

The dento-maxillary nerves, being distributed from the Gasserian ganglion, it is easy to see how reflex nerve irritation is caused by one of these offending teeth.

We often find an aggravation of throat troubles, deafness, stiffness of the muscles of the neck and face, facial neuralgia, local paralysis, prostrating pain, with severe abscess, and other local and systemic disturbances, caused by one or more of these impacted teeth.

Young women are often annoyed severely by these troubles, especially at the approach of the menstrual periods. Some had suffered from nervous troubles that did not yield to treatment. One had, for some time, complained of a dull pain in the back of the head and neck, had often difficulty in swallowing. The third molars, above and below, were removed, and in a few days there was no further trouble in swallowing, and she experienced general relief. In two other cases of similar trouble, relief was obtained by removing the inferior ones.

Often palliative treatment must be adopted for a time, when depletion of the gums, clipping away the portion overlying the tooth will prove sufficient to secure present relief.

Extraction should not be resorted to while the parts are much inflamed, if it can be safely deferred. Well adapted forceps, and other appliances, are not usually at hand to reach such cases in the best possible manner.

The superior third molars often demand attention. For want of room they are sometimes forced outward, causing muscular irritation by excoriating the inner portion of the cheek ; but they are more easily removed than are lower third molars.

SOUTHERN DENTAL JOURNAL.

REPLANTING TEETH.

By M. D. Lanier, D.D.S., M.D., Sylvania, Ga.

The writer gives his experience of transplanting teeth into artificial sockets.

Case 1st.—A young man, P——, æt 17, called to have his teeth examined. The right central incisor was decayed on both approximal surfaces, and had, from exposure of pulp, lost its vitality, and become abscessed. As the patient lived a good way off, it was decided to transplant the abscessed tooth.

The tooth was extracted, the crown cavities and the canal carefully cleaned and washed with a disinfectant, it was well dried, and then filled with gutta-percha, both root and crown.

The tooth was placed in tepid water, and returned, and fastened to the adjoining teeth with ligatures. No after treatment was necessary. The tooth was subsequently fractured, the root remaining firmly fixed.

Case No. 2, a girl of 16. The left upper central was badly decayed, the pulp gone ; an abscess was feared, the root was cleansed, and a temporary stopping inserted until next day. During the night the tooth became very painful, and she removed the filling, as instructed. The time was insufficient for more prolonged treatment, so the tooth was extracted, the root filled, and a contour filling placed in the crown. There was a little pain at first, but none afterwards.

Case 3rd.—Was similar to the last one.

Case 4th.—Upper bicuspid ; failure on account of lack of nerve and patience, on part of the lady patient.

Case 5th.—A man of 38 or 40 had a lower second molar previously filled, without any perceptible improvement, and it was a great annoyance to him. Replanting was quite successful.

Case 6th.—Both central incisors, at one sitting ; a complete success also.

DENTAL COSMOS.

PRINCIPLES AND METHODS OF FILLING TEETH WITH GOLD.

By A. G. Bennett, D.D.S., Philadelphia, Pa.

The writer advances that the subject he treats of, although frequently treated, yet is but imperfectly understood. He adds, "the operator" should have the knowledge to fill with gold, and he *must* have the skill to prevent breakage and leakage, the tooth being partly animal and partly mineral substance, the following are the essentials for cavity preparation :—

1. A cavity should be so prepared and its border so bevelled that when filled the tooth will offer the greatest resistance to mechanical and chemical forces.

2. Complex cavities should be so simplified and their parts

made so accessible that the filling material can be readily and certainly adapted to their walls.

3. Approximate cavities, which extend to the excising edges or occluding surfaces of the teeth, should be so prepared and filled that the strength of the operation will be equally divided between the tooth and the filling.

4. The walls of a cavity should have no corners or acute angles, and should, when possible, form the segment of a circle ; and the bevel of the enamel should, as far as may be, conform to the line of its cleavage.

5. Smooth, strong walls, secure anchorage, and perfect adaptation of the filling material to the tooth-bone are the essentials of durability.

6. As regards the enamel, it is better to remove too much than too little ; as respects the dentine, better to remove too little than too much ; and as to the anchorage, it had better be too deep than too shallow.

7. Anchorage should be secured by so combining pits and grooves as to do the least injury to the dentine and give the greatest strength to the filling ; and the enamel should, when possible, be supported by living dentine.

And, to sum up, smoothness of surface and softness of material insure closeness of adaptation.

A propos of the final preparation of approximal cavities, he speaks well of Dr. Jack's idea that a groove-cutter should have a rounded edge. A concave floor to the groove gives greatest strength, and is adapted to a convex surface on the plugger. After grooving, take a sharp spoon excavator of the proper size and remove the fine edge from the margin of the groove. With a chisel excavator cut and scrape the cervical wall till all softness of the dentine and roughness and whitish appearance of the enamel have been removed ; then polish all accessible surfaces.

The softness of the gold is the essential property for tooth-preservation. The value of the cohesive property, except for contour work and in restoring crowns, has been over-estimated, and has led many into error. He proceeds to show how the cohesive property of gold has, in many cases, led operators into grave troubles from the easy welding and difficult adaptation.

The best gold is that which can most safely and certainly be adapted to dentine and enamel walls. Extra-cohesive gold may not work the most easily, but it certainly works the most rapidly, as large pieces and many thicknesses can be used under a broad plugger; and it makes a mass securely welded; yet the adaptation may be most defective.

Few gold fillings are absolutely perfect. Two kinds of defects exist, those around the margins in the enamel or gold, and the second at any point over the entire surface of the cavity. As the condition of the cavity can be readily seen and the kind and form of gold selected, the causes of these defects can be narrowed down to the instrument and its proper or improper management.

1. It may be laid down as an axiom that pluggers should be so constructed and gold used in such a manner as to exclude, with the minimum of time and attention, all defects which from their nature cannot be detected by the eye.

2. Not only the shape of the tooth, but mechanical requirements, as well as æsthetic considerations, demand that the walls of a cavity should generally form the segment of a circle.

And if their form be not a matter of mere fancy, the size and shape of end and curve of shank in filling instruments must be determined by and adapted to the size and shape and position of the cavity.

3. Gold is adapted to dentine and enamel surfaces directly or indirectly. The walls being strong enough it should be adapted directly, and, when weak or the tooth frail, indirectly. Hence two kinds of pluggers—one for direct, the other for indirect, are advocated.

4. The cavity walls, especially the cervical, being concave, requires that the face of a "direct" plugger should be

convex, to secure perfect adaptation; and this form of face, besides, will insure thorough condensation and welding more certainly than a flat surface.

5. Experiments prove that gold will spread only under a convex surface, either smooth or serrated transversely, the instrument when serrated being so held that the cuts or valleys are at right angles to the cavity wall. Pits and grooves as well as small cavities and fissures admit only of indirect adaptation; hence "indirect" pluggers for these should always have a convex face, serrated in one direction only, so as to spread the gold slightly but firmly against the walls. "Direct" pluggers, when used within the cavity, may be serrated one or both ways; but when used beyond the walls they should be serrated in both directions.

6. "Direct" pluggers are generally of the foot shape, and consist of two kinds—one short and relatively thick, the other long and thin; the short being used within the cavity and beyond its walls, as in restorations; and the long being intended to complete the filling where space is limited, as between the front teeth. The end of an "indirect" plugger is usually small, and may be round, oval, or flat.

7. The serrations answer two objects, viz., prevent slipping and leave a rough surface. Smooth points slip.

8. Smooth convex points, besides spreading the gold, prevent pitting and porosity. Small points serrated both ways effectually prevent spreading, besides tearing and cutting up the gold; but convex surfaces cut one way combine the good qualities of both kinds without the defects of either. When soft gold is packed like tin, the serrations must be deep, and the plugger should be cut both ways, so as to secure sharp points to interlace the metal.

9. The pitting or porosity caused by serrations is reduced to the minimum by having the pluggers cut fine. Pluggers of the foot shape should always be serrated in both directions. Pluggers have been devised by the writer to fulfil these requirements.

This set of pluggers consists of modified and original forms. There are five ordinary round and one flat point, and six foot pluggers, three short and three long; and it is believed that these in connection with the most useful hand-pressure points will enable the operator to reach every cavity that can be entirely or partly filled by mallet force.

Literary Notices and Selections.

THE ARSENICAL TREATMENT OF TOOTH PULPS.

By A. Morsman, M.D., D.D.S., Iowa City.

It is with considerable hesitancy that I approach the subject of pulp devitalization. There are many among you older in practice than I, to whom my words will come with the monotone of an oft-repeated story. It must be remembered, however, that error does not give way to a single assertion, but to repetition and reiteration of truths.

As long ago as 1868, Prof. Flagg inveighed against the accepted doctrines regarding the use of arsenic, but nothing seems to have come of it, and teachers and writers go on promulgating the same vague and timidity-inspiring ideas, throwing students into the profession to learn by long and tedious experience, how to use this remedy to confer the most good and the least suffering upon their patients. In looking over standard text-books, I am impressed with the belief that he who begins practice with no more knowledge of this operation than he can obtain from this source, will count his failures upon his fingers, and his successes upon his thumbs.

The preparation of root canals for filling, from its inception to its termination, is an exceedingly difficult thing to do well, and an operation requiring great delicacy of manipulation to accomplish the object sought with the least infliction of suffering. This latter consideration is of the greatest importance in attempting devitilization.

Pain is an element that enters largely into almost all our operations, and to those whose dental imperfections should induce them to seek our aid, it is an obstacle, and one that is increased by every pang that we inflict. It is an obstacle to our success, also, by presenting to us, instead of simple cavities, easily managed and giving the promise of great utility, complicated cases, delay induced requiring great skill, and promising a lesser reward for our labours.

Commercial arsenic, or arsenious acid, has been used since 1836 for devitalizing tooth pulps. It has been misused and abused, but for all that it has become the accepted means to this end, and the number of pulps destroyed in other ways is proportionately very small.

Arsenic is a caustic irritant, and as such acts upon the dental pulp—just how, I do not pretend to say, but I see no reason for assuming that it is very different from other caustics in mode of action, save as increased potency is a difference. None of the "fine spun" theories that have been advanced throw any light upon the subject, because none of them agree with known facts. One ingenious theory is that the arsenic, being an irritant, causes congestion, congestion strangulation, and the pulp sloughs at the apical foramen. That is a good theory when the facts bear it out, but they don't very often, because only a small portion of pulps die in that way ; most of them are obstinate enough to die piece-meal. There is a great temptation to bridge a chasm of ignorance with a theory. One fact is worth a dozen theories, and there are times when it is creditable to say "I don't know."

The preliminary treatment of pulps that are to be subjected to arsenical devitalization demands earnest consideration. An application of arsenic to a tooth pulp in normal condition, if it has been properly made, will produce no pain, and will act with desirable promptitude, but just as there is deviation from normality in the pulp, so is deviation from comfort to the patient, and the action of the medicament is delayed. I wish to speak impressively, therefore, when I say arsenic should never be applied to a pulp that is congested, or inflamed, or that has ached during the preceding forty-eight hours, without preliminary treatment.

(*To be concluded.*)

Dental News.

STUDENTS' SOCIETY OF DENTAL HOSPITAL OF LONDON.

ORDINARY GENERAL MEETING HELD MARCH 8th, 1886.

G. W. Parkinson, Esq., President, in the Chair.

The minutes of the previous meeting were read and confirmed.

Messrs. T. G. Read and E. J. Hall were balloted for and elected members of the Society.

A discussion was raised by the President on the subject of the proposed Conversazione, and on its being put to the meeting it was decided to hold a Conversazione at the end of June, or beginning of July, and to admit ladies.

It was also decided to hold a Smoking Concert towards the end of the present month, and Messrs. Rouw, Gilbeart, and Cates were elected to form the sub-committee to arrange details, with power to add to their number.

On casual communications being called, Mr. H. Williams showed models of a case of well-marked, peg-shaped upper laterals, and also of a case of retarded dentition. In the upper the permanent laterals were absent, their places being taken by the permanent canines, while the temporary canines persisted in their normal position ; in the lower the second bicuspids were absent, the second temporary molars being still in situ. The patients' age was twenty-three. Mr. F. T. Miller showed a well-marked case of exostosis in a lower wisdom.

Mr. C. F. Rilot showed a good specimen of needle-point absorption in an upper canine, and also the model of a mouth in which the cingulum of each upper canine had been raised into a distinct cusp. He also made some remarks on a case presenting at the Hespital in which the pressure of a badly-made artificial plate had caused exposure and subsequen exfoliation of a large piece of the bone of the lower jaw.

The president then called on Mr. H. J. Moore for his paper on "Diseases of the Antrum." The subject was well worked up, and was listened to with great attention. In the discussion which followed, the President, Messrs. Rilot, Miller, Rouw, Whittaker, Frost, J. S. Acton, and Hodgkinson took part.

Mr. Moore having replied, a vote of thanks for his interesting paper was moved by the President, seconded by Mr. Whittaker, and carried by acclamation.

The President announced that the next meeting would take place on Monday, May 10th, when Mr. T. H. G. Wrighton would read a paper on "Syphilis as it effects the mouth."

The meeting was then adjourned.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The ordinary monthly meeting of the above society, was held March 1st, 1886, T. Charters White, M.R.C.S. and L.D.S., Eng., President in the Chair.

The minutes of the previous meeting having been read and confirmed,

Mr. Morgan Hughes signed the Obligation Book, and was formally admitted to membership by the President.

The President announced that the following gentlemen had been duly nominated as candidates for the membership, and would be ballotted for at a subsequent meeting. viz :—

Messrs. Alfred Edward Clayton Woodhouse, M.R.C.S., L.D.S., Eng., 1, Hanover Square, W.;

Murray Davis, L.D.S., Eng., Wimpole Street, Cavendish Square, W.;

George D. Campion, L.D.S., Eng., 264, Oxford Road, Manchester; and

Horace J. Lloyd Farebrother, L.D.S., Eng., Salisbury.

The following candidates were then ballotted for and elected members of the Society, viz:—

Messrs. W. J. England, L.D.S., Eng., 40, Wimpole Street, Cavendish Square, W.; and

Thos. Fred Barton Palmer, M.R.C.S., L.D.S., Eng. Priestgate, Peterborough.

Mr. Weiss announced that the President had presented to the Library a copy of Foster's "Handbook for the Physiological Laboratory," illustrated with photographs of microscopical specimens taken by himself.

The Curator (Mr. Storer Bennet) reported that he had received from Mr. Brunton, of Leeds, two photographs of Mr. Dunn's sections of the fractured and reunited tooth exhibited earlier in the session. Mr. Trench, of Queen Street, Northampton, had sent for the Museum a specimen of germinated upper molars. Mr. Benfold has presented an aquatint picture, dated 1796, representing the extraction of a tooth in a somewhat primitive manner, evidently affording much amusement to the on-lookers, and Mr. Wilson, of Hull, a plate which had been supplied to one of his patients while resident in Japan. The patient went seven days' journey to the town at which the dentist was practising, and had to remain there a fortnight, and after all this trouble and expense the plate was found to be quite useless. The practitioner in question was *not* a native of Japan.

He had also acquired for the Museum the skulls and lower jaws of a female dugong, of a young hippopotamas, and of an American wart-hog. These specimens he hoped to describe more fully on a future occasion.

The secretary showed a model, sent by Mr. J. C. Foran, of Eastbourne, of the mouth of a girl, aged thirteen, showing the effects of necrosis caused by typhoid fever, and read notes of the case.

The girl, when eight years old, had a very severe attack of typhoid. During the illness it was noticed that the four lower incisors were quite loose, and in a short time they came away together with sequestra of necrosed bone. Not long afterwards the canines erupted and moved forwards, filling the gap in the way shown in the model.

The upper teeth were quite normal, except that the mouth was rather crowded, notwithstanding the fact that the upper first bicuspids had been extracted to make room.

The President remarked on the remarkable manner in which the gap caused by the loss of the incisors had been filled up. It seemed that when the wisdom teeth were erupted the small space left would be closed up.

Mr. Whatford, of Eastbourne showed a model of the upper jaw of a young man, aged eighteen, showing absence of the bicuspid teeth on either side. The temporary canines had been retained and the permanent canines had come down between them and the six-year-old molars. The patient's father and younger brother had the same deficiency, both retaining also the temporary canines. No very reliable history could be obtained with regard to the temporary molars, but it seemed probable that they were not erupted.

The President remarked that he had met with a very similar condition in a young lady who consulted him on account of the deformity. Both the temporary and permanent canines were present, the latter, as in this case, having been erupted at a considerable distance from the laterals. The young lady's father, who accompanied her, presented the same peculiarity.

Mr. Storer Bennett said he had received some specimdns to exhibit to the Society from Dr. Herbst, of Bremen. Amongst them was a new ring matrix, similar to one which he (Mr. Bennett) had been using for about three months, and had found very efficacicus, it was simple and easily made. There were also two medallions made from signet rings by the rotation method in five minutes each, showing clearly the close adaptation of the gold to the surface against which it was packed which was obtained by this method ; a molar entirely built up from the root in an hour and a quarter—very quick work, considering its size ; and specimens of some new (No. 30) gold foil made by Wolrab.

The President said most of the specimens appeared to be similar to those sent to the Society last year by Dr. Herbst, but they were good illustrations of the capabilities of the process. The medallions especially showed well what perfect contact could be obtained between the gold and the walls of the cavity. He thought the method had a splendid future before it, and that the present generation of students enjoyed a great advantage in being trained in the practice of so valuable an addition to the ordinary modes of filling.

Dr. Field exhibited a new dental engine sent by Messrs. Jamieson, of Broad Street, in which the driving band or cord was dispensed with. On working the treadle the central upright rod of the engine revolved ; at the upper extremity of this was a small horizontal wheel which acted on another vertical wheel which was attached to the lower end of the flexible arm. The machine was thus very simple in construction, there was no cord to get twisted or loose, and the action was quite noiseless.

He also showed two scalers for removing tartar from the lower molars, mentioned by Dr. Harlan at the previous meeting.

The President said he understood that Dr. Field himself was entitled to the credit of having suggested the very ingenious modification of the dental engine which had been carried out by Messrs. Jamieson.

He thought Dr. Harlan's scalers would be very useful, not only for the teeth for which they were specially intended, but also for passing between the lower incisors. He then called on Dr. Dudley Buxton to read his paper on "The Physiological Action of Nitrous Oxide."

APPOINTMENT.

Mr. E. A. Bevers, M.R.C.S., L.S.A., has been appointed Consulting Dental Surgeon to the Radcliffe Infirmary, Oxford.

BIRMINGHAM DENTAL HOSPITAL.

MARCH, 1886.

Number of patients	932
Completed Fillings	59
Gold Fillings	6
Dressings.	113
Miscellaneous	97
Extractions	661

W. PALETHORPE, House Strgeon.

WORK DONE AT THE LONDON DENTAL HOSPITAL

DURING THE MONTH OF FEBRUARY, 1886.

Extractions	Adults	813
	Under 14	258
	Anæsthetics	458
Stoppings.—	Gold	283
	Other Stoppings	1318
	Advice	159
	Irregularities	172
	Miscellaneous	420
	TOTAL	3926

H. LLOYD WILLIAMS, M.R.C.S., L.D.S., House Surgeon.

DENTAL HOSPITAL REPORTS. NATIONAL DENTAL HOSPITAL.

MONTHLY STATEMENT OF OPERATIONS PERFORMED, From March 1st, to March 31st, 1886.

Number of patients attended		1670
Extractions	Children under 14	464
	Adults	693
	Under Nitrous Oxide	486
Gold Stoppings		80
Other Stoppings		680
Advice and Scaling		342
Irregularities of the Teeth		202
Miscellaneous		148
TOTAL		3095

ISIDORE FRED. PRAGER, House Surgeon.

British Journal of Dental Science.

No. 439. LONDON, MAY 1, 1886. Vol. XXIX

ON THE PHYSIOLOGICAL ACTION OF NITROUS OXIDE.*

"Quant à l'action anesthésique en elle-même, elle est parfaitement independente de l'asphyxie, et elle se produit par un tout autre mècanisme."—CLAUDE BERNARD.

By Dudley Wilmot Buxton, M.D., B.S.Lond., M.R.C.P.
Administrator of Anæsthetics in University College Hospital, the Hospital for Women, Soho Square, and the Dental Hospital of London, &c.

Concluded from page 342.

It has been said by those who regard nitrous oxide as analogous in its action to nitrogen, or any other indifferent gas, that it differs only in so far that one gas is able to oust oxygen from oxyhæmo-globin sooner than another, an assumption which seems to me to be purely gratuitous, since the reduction must take place in the tissues, the blood supplying them until its store of oxygen is exhausted, when asphyxia takes place. Bernard, whose classical work on asphyxia gives the fullest account of that condition with which I am acquainted, speaks of three forms of asphyxia :

(1) That arising from inhalation of irrespirable gases which are themselves harmless. To this class many authorities would relegate nitrous oxide.

(2) That due to poisonous vapours, such as carbonic monoxide, sulphuretted hydrogen ; and

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* A Paper read before the Odontological Society of Great Britain.

(3) Asphyxia from want of air, such, for example, as would ensue upon ligature of the trachea. He subsequently points out, and I think with justice, that asphyxia resulting from the inhalation of an indifferent irrespirable gas, and that due to want of access to air, are in fact one and the same condition.

Let us now consider very carefully indeed the process of phenomena ensuing from deprivation of oxygen, that we may compare them with the course of events in nitrous oxide narcosis. It seems to me that, even if we fail to establish what is the exact nature of nitrous oxide narcosis, we cannot fail to see many striking discrepancies between it and asphyxia pure and simple.

The arterial blood becoming gradually deoxidised, by parting with its oxygen to the tissues, acts upon the Medulla respiratory centres ; hence follows hyperpnœa. This in the case of some persons subjected to experiments by Drs. Burdon Sanderson, John Murray, and Mr. J. Smith-Turner, who caused them to respire pure nitrogen, did not occur for about two minutes after commencement of inhalation. With the increased venosity of the blood follows the tumultuous breathing of dyspnœa when all the accessory muscles are called into action. Subsequently expiration becomes markedly in excess of inspiration. Expiratory convulsions then ensue. The convulsions cease owing to the exhaustion of the nervous centres, the pupils are dilated, the conjunctival reflex cannot be elicited, the muscles are flaccid and quite. At ever lengthening intervals the respiratory centre gathers itself together, and starts a long inspiration ; these grow more and more shallow, and at length cease. Lastly the heart stops. It is convenient to separate these phenomena into three stages :

(1) Dyspnœa, when both inspiration and expiration are in excess ;

(2) Convulsions, when expiratory efforts exceed inspiratory ;

(3) Exhaustion.

Now let us contemplate the circulatory changes occurring during the procession of these phenomena. The first change of importance is a rapid rise of blood pressure ; this, persisting during the first and second stages, is due to stimulation of the vaso-motor centres by the venous blood, resulting in a constriction of the arterioles. Coincident with this is an acceleration of the heart beat ; this, however, rapidly gives place to slowing and increase in the force of the beat. During the third stage the blood pressure rapidly falls to nil, and the heart beats become very slow and feeble, and finally cease. The duration of these stages of asphyxia have not been accurately determined in the case of human beings. In dogs the first stage occupies about a minute, and death ensues in four or five minutes. In the cases cited above, when patients were partly asphyxiated with nitrogen, they were subjected to the process for periods varying from three minutes to four minutes, and yet had evinced none of the phenomena usually found in the second stage of asphyxia. We also know that voluntary breath-holding can be maintained for over a minute; hence it would seem not improbable that man takes at least as long as dogs to die from deprivation of oxygen.

Now I would ask your close attention to the phenomena of the so-called asphyxia of nitrous oxide narcosis.

In the first place we find a tolerably uniform increase in the number and and depth of respirations. I have never as yet succeeded in detecting any excess of expiratory over inspiratory movements. The respirations are, and I speak under correction, simply an exaggeration of the normal, quite regular, but hurried in rhythm and increased in depth. And this begins certainly within half a minute, usually within fifteen seconds, from the commencement of nitrous oxide inhalation. The respirations, however, slow as narcosis proceeds, and finally stertor supervenes, which frequently is followed by a period of complete respiratory calm, no thoracic movements appearing. A few seconds more and respirations are recommenced, and the person passes quietly into the ordinary swing of his breathing. I have never observed anything which in the slightest degree resembled the expiratory convulsions one is so familiar with in the case of the lower animals killed by asphyxia.

Again, in considering this subject it occurred to me that one should find the same circulatory changes taking place during nitrous oxide narcosis as obtained during asphyxia were the conditions one and the same. I am at present engaged upon this research, but have not been able to place the matter beyond doubt. In a series of sphygmographic traces, some of which I have placed before the Society, I have sought to determine what variation in tension occurs during nitrous oxide narcosis. These traces were taken upon persons sufficiently accustomed to inhaling the gas to eliminate as far as possible the circulatory changes due to fear, &c. I need hardly add no surgical procedure was undertaken, as such must have introduced the disturbing element of shock. I mention this as in some of the traces published such surgical procedure has been allowed, and so, as I think, a most disturbing factor introduced. In conducting these experiments it has been my custom to take a trace of the normal pulse before narcosis was commenced ; and then after ten seconds or so of gas another trace was taken, and this was continued until consciousness returned.

In no case have I succeeded in obtaining any marked increase in tension in the pulse trace, and there has appeared to me to be an actual lessening of the tension during narcosis, as evidenced in the loss of tidal wave. I should mention that in most cases the narcosis was pushed very far, jactitations and extreme cyanosis being induced. A careful study of the tracings now before the Society will reveal the following facts. In the first place there is a very notable acceleration of the pulse, and this persists throughout the whole period of narcosis ; secondly, the following signs of a lowered tension will be recognised. The tidal wave is lessened or almost lost, the dicrotism of the pulse becomes strongly marked ; the acuteness also of the initial curve will be seen to be considerably increased. A further point will be observed in some of the traces, viz., that the dicrotic wave is further down the curve when the patient is under the influence of the gas than is normal. These evidences of lowered tension appear to me to be constant in my results, although of course I can only show a few specimens here to-night. Now, unless we deny the evidence before us, it seems remarkable that nitrous oxide should cause such evidence of lowered tension, unless it was really a fact that in some way nitrous oxide is capable of lowering the tension of the blood in the arteries, and of accelerating the heart's action. At the same time I am anxious not to seem to attach an undue importance to sphygmographic records; I would simply urge that taken with the utmost caution they reveal a fairly uniform result. To investigate this question of blood pressure still further I have undertaken some experiments whereby the actual pressure in the blood vessels of dogs has been determined. The result of these I hope to lay before you upon a subsequent occasion, but I may say that when due allowances are made, I believe the results will go to strengthen my present contention, that nitrous oxide pushed to the extent of narcosis does not give rise to circulatory changes at all comparable to those occurring in the course of asphyxia.

The results obtained by the cardiograph in the human subject have not been encouraging, and I have therefore determined to investigate the exposed hearts of mammals as likely to render a more reliable record. In this connection the experiments of Amory, Krishaber, Goldstein, and Kuntz are of interest. These observers found that animals, when subjected to the vapour of nitrous oxide, after a time died. Now it is important to notice that the animals, when made the subject of a post-mortem examination, revealed the usual signs of asphyxial poisoning. But this is, of course, a wholly different thing to death from nitrous oxide. In these animals nitrous oxide narcosis was followed by suffocation, air was excluded, and hence asphyxia ensued. I believe it has happened to skilled anæsthetists to have a necessity of maintaining nitrous oxide narcosis for a considerable time. This has been done by allowing the patient to respire air at long intervals. In this way a really prolonged narcosis can be effected. Clearly in such cases the narcosis was something wholly outside of the concurrent asphyxia, and it is the great disadvantage of our present methods of administering nitrous oxide that we can hardly avoid producing more or less asphyxia while we are seeking only to promote the action of nitrous oxide upon the nervous centres. M. Paul Bert has by his well-known plan sought to obviate this drawback. I do not propose to address you upon his method, as that is as well known to you as to me, but I claim your attention to the important fact which underlies the success of M. Paul Bert's system. It is, that so long as he succeeds in supplying the bodily need of oxygen side by side with enough nitrous oxide to induce narcosis, he is able to achieve a prolonged unconsciousness, and yet his patient maintains his respiratory and vital equilibrium. I have no personal experience of the method, nor am I aware whether a narcosis lasting so long as an hour has been achieved.

It yet remains to be shown whether nitrous oxide acts in virtue of a power it might possess of reducing the oxyhæmoglobin of the blood, the oxy-myo-hæmatin and oxyhæmoglobin of the tissues. Were this the case we should expect to find it capable of either fixing the oxygen, as in the case of carbonic monoxide hæmoglobin, or of producing a very rapid asphyxia, which I have attempted to show it does not do. I am also unaware of any facts which show that nitrous oxide is capable when in the blood of linking itself, on the one hand, with another molecule of oxygen, or on the other of fixing the oxygen in any other tissues, including the blood ; if neither of such occurrences actually happen, it is hard to see what becomes of the oxygen, even were nitrous oxide capable of ousting it. As I have pointed out above, the evidence we derive from spectroscopic examination is not convincing, as MacMunn only examined the blood after death, and not simply during narcosis. A test of great value would be the examination of blood shed during an operation performed when narcosis after Paul Bert's method had been obtained.

We may, I think, then, conclude that nitrous oxide produces narcosis by virtue of other than asphyxiating qualities.

This gas, then, enters the blood through the lungs and exercises a certain specific action upon the nervous centres. And here we have a ready explanation of an otherwise most anomalous circumstance, viz., that in a certain number of cases persons evince the utmost toleration for nitrous oxide, and resist its nepenthal action for a minute or more. I doubt not members who are here to-night can furnish me with instances of this idiosyncracy. In other words, these persons need a larger *dose* of this agent, nitrous oxide. It is inconceivable, I think, that were the effect other than a specific one, that quantity, or dose, as I prefer to call it, could have any effect. To explain. Were I to curarise a rabbit, I should produce complete paralysis of all its muscles, and the creature would die asphyxiated. Now I should always produce this result whatever quantity above a certain dose was given; the asphyxia is mechanical. So, were nitrous oxide purely an asphyxiant, I should invariably narcotise my patient when I had replaced his oxygen; but such is not the case—in fact, I narcotise him *before his oxygen is exhausted*, and, I submit, a long while before.

But there yet remains to discuss in what consists this specific action of nitrous oxide. As I explained, it is impossible for me in the space at my disposal to enter at all fully upon this question upon the present occasion, and so I will confine myself to a brief summary and leave it for elaboration in my next paper.

Nitrous oxide, then, may be taken as in all probability entering the blood by forming a loose combination with either the oxyhæmoglobin or the globulins and other albuminous bodies. It then passes to the nerve centres, and gives rise to subjective exhilaration, acting in fact as a stimulant. Upon the heart it would in this stage appear to act mainly as an accelerator, but in what way I am at present not prepared to hazard a speculation. Subsequently the nervous centres pass from their initial stimulation to a condition of narcosis in which volitional activity is in abeyance. At this time the inhibitory centres are in a state of at least lessened activity as is evidenced by involuntary movements, micturition, &c.

later the reflexes are lost. During this stage the blood pressure would appear to be lessened, the action of the heart accelerated, and the respiratory rhythm, at first quickened, subsequently slowed to a standstill. This state of things persists for awhile, and is accompanied by relaxation of some muscles, *e.g.*, the palatine and faucial muscles, while other muscles are the seat of arhythmic clonic and tonic contractions. Following upon this stage, we usually meet with the phenomena of recovery. At the present time I shall restrict my attention to these, because when the gas is pushed further the resulting action is a complex one, and largely due to want of access of oxygen. During the period of recovery, a further stage of excitement appears, and it is commonly associated with hallucinations, sometimes pleasant, sometimes extravagant. The senses soon become keenly upon the alert, and operative measures prolonged into this period give rise to the most intense pain. Patients will declare the pain in such cases transcends that where no gas is given.

Here, then, is very briefly summarised a theory, at present inadequate and incomplete, of the action of nitrous oxide ; to it I shall hope to return and to offer some further elaboration of a subject as difficult as it is interesting, as complex as it is important.

DISCUSSION UPON DR. BUXTON'S PAPER UPON THE PHYSIOLOGICAL ACTION OF NITROUS OXIDE.

The President said the close attention with which the paper had evidently been followed by those present showed the great interest they took in the subject. He scarcely felt competent himself to criticise such a paper, at all events until he had had an opportunity of reading it carefully in print ; but he saw several gentlemen present who had given special attention to the subject, and he should be glad to hear how far they agreed with the conclusions arrived at by Dr. Buxton.

Mr. Woodhouse Braine said he had listened with a great deal of pleasure to Dr. Buxton's paper, but unfortunately it only dealt with a part, and the least important part, of the subject, and it appeared to him that at present there was little or nothing to discuss. He thought it would be better to wait until they had heard the second part, and then discuss the subject as a whole, there was nothing in Dr. Buxton's paper, so far as he had gone, to which he personally was inclined to take exception.

Mr. Bowman Macleod agreed with Mr. Braine that it would probably be best to defer the discussion until they had heard the conclusion of the paper. Meanwhile, however, he wished to call Dr. Buxton's attention to a point to which he had not alluded, and of which he might not be aware. In the days when liquid gas was not so easily procurable as it was now, he (Mr. Macleod) had been in the habit of making his own gas, and he found that the first portion that came off when the nitrate of ammonia was heated was what was known as "laughing gas," and that after five minutes or so came the purer nitrous oxide as now used. He had collected this "foreshot" in a separate bag, and breathed it and found that it produced intense exhilaration and uncontrollable excitement, whilst what came afterwards produced only placidly exhilarating, rapidly followed by narcotic effects. He hoped that Dr. Buxton would take the trouble to repeat this experiment, and, if possible, determine by careful analysis the exact composition of the foreshot and the cause of its peculiar effect on the system.

Mr. Tom Bird thought there were one or two points in the paper which might be profitably discussed without waiting for the concluding portion. The centre of the paper was the part which had interested him most, viz., that in which Dr. Buxton had described the effects of the gas on the patient. Now these effects varied considerably, as might be expected from the widely different conditions, mental and physical, of the patients, and this introduced a source of difficulty into such experiments as Dr. Buxton had attempted to carry out since unless a succession of perfectly normal patients could be obtained it was impossible to obtain a perfectly normal set of results.

Then with regard to the comparison between the breathing of nitrogen and of nitrous oxide, he would remind Dr. Buxton that nitrogen was an insoluble gas, whilst nitrous oxide was not. The latter was taken up by the blood, the composition of which thus became changed.

Mr. S. J. Hutchinson said the Society was indebted to Dr. Buxton for a very complete essay on the physiology of nitrous oxide. He should be glad, however, if Dr. Buxton would give his authority for the statement that apnœa did not produce a form of anæsthesia. There could be no doubt that Dr. Bonwill's method of breathing as rapidly as possibly until it could be kept up no longer, did produce a state of apnœa, and that this was accompanied by more or less anæsthesia.

It must not be forgotten also that the conditions of nitrous oxide narcosis differed greatly according as it was given with the expiratory valve closed or opened. In the first case, the gas and expired air being rebreathed, there was excess of nitrogen with deficiency of oxygen, whilst in the other there was deprivation of oxygen.

Dr. Hewitt thought that facts pointed strongly to the conclusion that nitrous oxide acted in the same way as ether, chloroform, and other anæsthetics—*i.e.*, it was absorbed by the blood in the pulmonary circulation, was carried by it to the brain, and acted on the higher centres just as they did. Analysis of the products of respiration during administration of the gas showed that these consisted at first of nitrous oxide and expired air, and later chiefly of nitrous oxide, and that they did not contain any excess of nitrogen or of oxygen, showing that the gas was not decomposed in the blood. There could be no doubt, however, that in the ordinary mode of administration the anæsthesia produced was due to a double cause, it was partly the result of the narcotic effect of the gas, and partly asphyxial from deprivation of oxygen. The object to be aimed at was to get as much of the former and as little of the latter as possible, or at all events to delay it as long as possible. By M. Paul Bert's method the tendency to asphyxia was obviated altogether, and it could be delayed by the use of the supplemental bag.

If when the gas was given, the expired air and gas were suffered to escape, a certain amount of the oxygen in the lungs was lost at each expiration until it was all gone; nitrous oxide alone was then presented to the brain centres, and the respiratory movements could be no longer carried on. But if, after washing out the lungs with nitrous oxide, the supplemental bag was used, a small quantity of oxygen was still supplied with each inspiration, and by this means anæsthesia could be maintained for a longer period. He had found by analysis that a two-gallon supplemental bag at the end of an ordinary administration still contained two or three per cent of oxygen.

Mr. Henri Weiss said he had been greatly interested by the sphygmographic tracings which Dr. Buxton had exhibited, and he thought that others besides himself must have learned with pleasure that the blood pressure was *reduced* during the administration of nitrous oxide, and not increased as had generally been snpposed to be the case, and that there need not therefore be any hesitation in giving gas to individuals of full habit for fear of increasing the liability of apoplexy.

The President said he had also been greatly interested in seeing the effect of the gas on the circulation, as shown by the sphygmographic tracings, the more so since he had him self made some observations under the microscope, with reference to the effect of chloroform on the circulation of the frog. It acted as a very decided depressant, the blood current getting gradually slower until the corpuscles could be seen to regurgitate at each feeble pulsation, and at last became quite stationary. He must now call upon Dr. Buxton for his reply.

Dr. Buxton remarked that it would take more time than he had at his disposal to answer fully some of the questions put to him; he would therefore content himself with very brief replies to the criticisms which had been made on his paper. He was much obliged to Mr. Macleod for the hint which he had given him, and should take an early opportunity of trying to find out the cause of the difference to which he had called attention. The fact that nitrogen was an insoluble gas, whilst nitrous oxide was soluble, did not appear to him to be of much importance, or to throw much light on the problem they had to solve. He quite agreed with Mr. Bird as to the importance of eliminating as far as possible all sources of error in making experiments on individuals, and with this view all his own experiments had been made on personal friends and not on patients. He still held that apnœal states were not necessarily anæsthetic. Dr. Bonwill's plan acted by exhausting the nervous system for the time, just as great muscular exertion would do.

Dr. Hewitt said that nitrous oxide circulated as a gas. He (Dr. Buxton) had not been able to obtain any proof of this, nor did he know that any one else had succeeded in doing so. Dr. Frankland, indeed, in the course of the experiments on rabbits referred to in the paper, had found that the products of respiration contained a slight excess of nitrogen, which might possibly be an indication that the part played by nitrous oxide in the system was not quite as simple as Dr. Hewitt seemed to think ; otherwise, the views expressed by Dr. Hewitt agreed very closely with his own, since the aim of his paper had been to show that the anæsthesia produced by nitrous oxide was central—due to changes in the cortical cells of the brain—that the end organs had nothing to do with it, and that the phenomena produced by it were altogether distinct from those produced by ordinary asphyxia. In the first place the effects were much more rapid. Had any one known insensibility to be produced by asphyxia in half a minute ? And in the next place, when the oxygen of the blood was exhausted so as to produce asphyxia the respiratory centres in the medulla became paralysed and the movements of respiration ceased ; whilst under gas complete insensibility co-existed with regular breathing. He thought there was sufficient evidence to show that nitrous oxide acted as a stimulating narcotic, though no doubt some of the symptoms produced during the ordinary mode of administration were due to partial asphyxia. There was also the important fact that the state of the circulation during nitrous oxide narcosis was absolutely distinct from that produced by asphyxia, and any one who wished to prove that nitrous oxide acted simply by producing a state of partial asphyxia must be prepared to invalidate the evidence he had brought forward in proof this difference.

The President then thanked Dr. Buxton on behalf of the Society for his paper. The applause which he heard testified to the pleasure which the paper had afforded, and he felt sure that the promised continuation would be looked forward to with great interest.

The Society then adjourned.

IRREGULARITIES IN HUMAN TEETH; OR DENTAL TERATOLOGY.*

By John J. R. Patrick, D.D.S., of Belleville, Ill.

There is nothing more certain to the reflective mind than the intimate relation of all the sciences; for there is no single branch of natural science, when properly studied, but places every other branch under contribution.

Thus the geologist, in constructing the history of the earth, has to consult chemistry, astronomy and mechanical philosophy at one extremity, and all other branches of natural history at the other; exclude paleontology, botany, zoology, or conchology from geology, or any one of the branches of human knowledge which may be capable of furnishing facts or ideas that can be reduced to law, and just so far will it be defective as a science. What is true of geology is equally true of the science and practise of dentistry: neglect all or any of the sciences upon which it is founded and devote all your energies to the operative, or bread-and-butter department, and the profession, which is confided to our keeping, will dwindle to insignificance, and become unproductive and puerile in its character. The intelligent practice of dentistry,

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*A paper read before the Illinois State Dental Society, and published in the *Transactions*.

like that of medicine, is the result of science, rather than an individual science, and when it either becomes, in whole or in part, deprived of its natural sustenance it becomes enfeebled. For all that the *theory and practice* of medicine or dentistry can claim, or do claim, is scientific associations; separated from anatomical, physiological, and pathological relationship, they would become mere trades or crafts, and justly fail to attract intelligent students or command the respect and confidence of mankind.

I have been led to these reflections by perusing a number of articles on the irregularity and the degeneracy of the human teeth, which have appeared from time to time, in our dental journals and Society Transactions; and it is remarkable with what unlimited confidence the writers rely upon their own limited observation, ignoring in most instances, the existence of well established laws, laid down in the text books of the different branches of natural science, which relate to the subject upon which they write.

I propose to present a few facts for your consideration, concerning the teeth of man and other animals, which will serve to explain the cause of irregularity and decay of the teeth of man, while other animals are exempt both from irregularity and decay, excepting where mal-conditions exist, the result of accident, or the multiplicity or lack of structure, as in monstrosities. "The great deviation which occasionally occurs in the development of man and the lower animals from the normal type, and which is commonly embraced under the general term 'monstrosities,' is a subject so full of interest as not only to have attracted the attention of common observers, but to have engaged the profound consideration of philosophers in all ages;" hence we have a science called "teratology," an appropriate name for the science of monstrosities. To persons whose attention has not been directed to this field of inquiry the question will arise, For what purpose is this investigation? To which it may be replied, that the subject is invested with profound interest in its relations to embryology and general physiology, as it embraces all the conditions of development in all the multiform classes of organised beings, and there is scarcely any general fact, any anatomical or physiological law on which it does not reflect light, and either confirm or disprove. Further, "the relative importance, and even the necessity, of certain organs in the maintenance or continuance of life have been chiefly learned from a careful examination of cases of monstrosities. Nearly every organ in the human body has been found absent in a series of individual cases; in some instances only admitting of fœtal or intra-uterine life, while in others more or less permanent viability has been proven to be compatible with the lowest rudimentary development, or entire absence of organs which are commonly regarded as essential to life. For example, cases have occurred in which the brain was entirely absent, while every other portion of the nervous system was normally developed. In others a well-formed body has existed in which the vascular system has been completely developed and symetrically distributed, and yet no rudiment of a heart could be found—thus demonstrating the independence of the development of nerves relating to the brain, and of blood-vessels to the great central organ of circulation. The history of anomalies of organization is no longer to be regarded as a mere detail of prodigies and sports of nature, resulting from supernatural causes, but requires to be studied as a science which is governed by natural laws, no less certain in their operation and results than those which are concerned in normal development." What is true of the abnormal development of the body as a whole, is equally true of any portion of it; we have retarded developments of certain portions and excessive developments in other portions of the same body, so slight in the majority of instances as to escape detection. The anchylosis of the sutures of the cranium determines the form and size of the skull, and the same is true in regard to the bones of the face; a failure of the palate process to anchylose with its opposite would result in what is understood to be cleavage or simple division of the maxillary bones. The non-development of the intermaxillary bone or incisive process when entirely wanting is generally accompanied with cleft-palate, with or without harelip, but a partial development of the intermaxillary bone may occur without cleft-palate or harelip, and therefore carry no incisor teeth. The intermaxillary bone may be so narrow, laterally, that the lateral incisors will be missing, as in most of the rodents, while the maxillary bones will be developed forward, carrying a duplicity of canines on either side; the two posterior ones, right and left, frequently being deciduous. So also, in the case of a laterally contracted intermaxillary, it may carry four incisors, the two laterals immediately behind the two centrals, after the manner of rodents of the genus *lepus* (hares and rabbits.) Now, in the felines and carnivora the intermaxillary bone carries six incisors, and in some species, as the opossum, the same bone carries ten incisor teeth; and there are cases in man where the same bone carries five or six, but the supernumerary teeth resemble, in form, the two external incisors of the carnivora; thus that which is normal in the lower animals becomes abnormal in man.

Again the intermaxillary bone may be too short, vertically, but broad enough, laterally, to carry the four incisors; yet these incisors, although well developed, will be too short to occlude with the lower incisors when the molar teeth are brought in contact. In some persons the two front incisors are so far apart that a more or less interspace exists between them; in this space there are sometimes one or two very anomalously formed teeth; sometimes these teeth are found on the palatine arch, immediately behind the middle incisors, but never occurring beyond the limits of the intermaxillary bone. The reason why the front incisors are found sometimes so far apart is owing to the unusual thickness of the two dental septa, which separate the teeth from each other, and the spongy mass of osseous substance which unites the two walls of the maxillary bones in this region. The interspace is sometimes found between the middle incisors of the inferior maxillary, originating from the same cause, an excessive development of the dental septa, or the too distant location of the dental germs. Any of the organs of the body may be abnormally placed, and may exceed in number that which is usually the normal condition, without presenting any irregularity of form. An incisor, for instance, may present its margins to anterior and posterior in the place of its anterior and posterior surfaces ; the right eye may be smaller than the left and the vision not be impaired, and there may be three regularly shaped bicuspids on one side, or six well formed fingers on one hand. If, however, the shape of a particular organ is different from that which is the rule, and if two or more organs are conjoined, they are malformations, which must be considered as products of a physiological process. Teeth, the crowns of which are only half enameled, or teeth that are bent in any manner, club-feet, two teeth concreted, fingers joined, or partial union of twins, are examples of a physiological process.

The dental organs of the human subject present many anomalies ; there are found on the enamel of otherwise well formed teeth, spots of various sizes and color, small blind holes, projections and depressions, furrows and corrugations. And while some teeth have patches of the crown devoid of enamel, others have patches of enamel on the cervical border, and even on the roots. Those organs which have undergone a change in their form after their complete development, and have become joined with adjacent organs, have undergone a pathological process, and, accordingly, must be considered as pathological products ; such is a cicatrized surface, the result of previous injuries, and the coalescence or fusion of the roots of two teeth in consequence of previous inflammation or disturbance. Thus we must consider that when teeth previously separate in their germs or follicles, subsequently become joined to their neighbours, owing to a non-development or absorption of the dental septa, the union is a pathological process of simple fusion. And when teeth become connected, either wholly or in part, during their inceptive development by a process of intimate union, such union cannot be viewed in any other light than that of a process of physiological confusion. Now, the roots of individual teeth present the greatest number of examples of confusion ; since, while growing, the external posterior roots of the superior molars are frequently united with the internal or palate roots of the same tooth, and the same phenomena occur with the anterior and posterior roots of the inferior molars, whereas the fusion of divided roots is very rare, and can only take place when they are very near each other, either in their entire length or at their extreme points, or when the intermediate root-septum is either absorbed or is concreted with them. Fusion of two molars can take place in the fangs only; for owing to the interval of time in the development of such teeth confusion is impossible. How is it possible for a six-year molar crown to be confused with a twelve-year molar crown; or a twelve-year molar crown to be confused with a *dens sapientia*, which usually appears twelve years later in life?

Supernumerary teeth may become confused with true molars, or with a bicuspid; but only under the supposition that nature has provided a common primary cell for two germs would the confusion of the crowns and fangs of two molars be possible; for the confusion of the crowns would have to take place in the germs before the enamel organ became crystalized. Lateral incisors, or canines and bicuspids of the superior set, never become fused or confused with each other, for the following reasons:—The germs of the canines originate in the maxillary bone proper, and the sutures of the intermaxillary interpose a barrier between the germs of the lateral incisors and the canines; so it is with the two central incisors of both jaws; the median suture forbids the union of these teeth either by fusion or confusion. Now the canines and first bicuspids of either jaw have not the same barrier to prevent their union, yet there are reasons equally as strong for their not becoming united. The great individuality of the canines, their length of roots, the distance they are placed in their germinal state from their neighbors, render their conjunction with their neighbors, if not impossible, at least very improbable. On the other hand, one front and lateral incisor may be confused together, but never fused together as in the molars, and in such cases a longitudinal depression will indicate the manner in which the germs were united. The incisors of the first set are more frequently found confused than their representatives of the second set; but all the other teeth of the second are more frequently found united than canines or molars of the first set.

The bicuspids of the permanent set, in very rare instances, have been found confused, but never conjoined at their fangs by the pathological process of fusion.

The roots of the teeth in the human subject are sometimes more, but frequently less than the normal standard, and when deficiency in number occurs it is found in the conjoined roots of the molars.

Those teeth which have more roots than the prevailing number are provided with accessory cells to receive the accessory radicles in the alveolar process.

The superior molars have sometimes four and sometimes five radicles.

The first superior bicuspids are usually provided with two roots connate, but with two separate canals, frequently with two roots separate, and sometimes three; when with three, two are placed externally as in the molars of the same series.

The second superior bicuspids have but one root and but one canal; sometimes two roots connate, but never entirely separated.

Canines may be often found with two roots connate and two canals, seldom with two roots separate their whole length; and sometimes they carry delicate rootlets.

The inferior molars usually have two roots, one anterior and one posterior; these roots are flattened from the anterior to the posterior, and in a majority of cases it will be observed that each root of these molars has a longitudinal depression or groove, indicating that each root is in reality two roots connate; and what is true of the external surface of these roots is also true of the internal, they will be found to have two canals more or less united. Sometimes the posterior root is divided, forming two roots, but this is seldom or never the case with the anterior root.

The front and lateral incisors very rarely carry rootlets.

Now, in regard to the relative proportion that the crowns of teeth bear to their roots, it will be found, as a rule, that teeth with very long or very large crowns have very short roots, while teeth that have very low or very short crowns have very long roots, and it is rarely that the proportion between the crown and the roots is well sustained ; therefore, in shifting such teeth, care should be observed, for as these teeth with long roots and short crowns will require much time to place them in a new position, on account of their deep cells and the small leverage the crown affords, so, likewise, greater care and more time will be required in moving teeth with short roots possessing long crowns ; for with the greater leverage of the crown over the short root such teeth are easily lifted out of their cells, which should never be done in regulating teeth, or, if done at all, done but slightly. In some subjects the crowns of the teeth are found to be exceedingly strong and arched, and in others where they should be arched they are depressed. On the crowns of some teeth there may be seen an indefinite number of cusps, and the crowns of others are curved and deformed in many ways ; but deformities and curvatures are much more frequently seen at the dental roots than at the crowns. In some subjects the teeth are so closely arranged that some of their number are crowded more or less out of the arch, and the reason why such teeth of the superior maxillary appear more frequently on the exterior than on the interior of the arch is partly owing to the natural inclination outwards of the superior set, and the flexible thin external wall of the alveolar process, which offers little resistance to the developing tooth. If, however, the developing tooth should have an inclination inwards, it must penetrate the internal strong wall, which is reinforced by the palate process, and which offers a barrier that, in many cases it can not remove. This thick firm wall is the reason why the teeth which take this direction appear later in life than those which break through the external wall. The canine teeth of the superior set, for example, usually break through the external thin wall and appear from the eleventh to the twelfth year; if, however, their course is directed to the internal thick wall their appearance is delayed to the eighteenth or twentieth year, and sometimes they are lost in the substance of the bone and never appear, as is also the case with the inferior wisdom teeth; or they may only become visible in very old age when the bone becomes absorbed. In the inferior set, however, the molar teeth have an inward inclination, owing to the internal thin wall and the external thick wall, which is reinforced in this region by the external oblique ridge. The external wall of this process, commencing with the right second bicuspid and extending round and ending with the left second bicuspid, is thinner and consequently weaker than the internal plate or wall of the same region; it therefore follows that the lines of strength and weakness intersect each other at the site of the second bicuspids* of the inferior maxillary. From this it will appear that numerical deficiency is mostly due to delayed development or obstructed appearance, and not actual absence of individual teeth. Observation shows that irregularities of position of the teeth occur in either maxillary, or in both at the same time; but such irregularities occur more frequently in the superior than in the inferior set, and oftener with the anterior than with the posterior teeth. The variations in the forms of the teeth, which in early youth are not fully developed, the shape of which undergoes change by later development by a progressive physiological metamorphosis, and those changes in organic structure which take place by a retrogressive physiological metamorphosis, will not be considered in this connection; neither will a special description of a regular set of teeth be given, either of the deciduous or permanent set, but a general description of both with the alveolar process, as being more pertinent to the subject under consideration. The deciduous teeth are of three kinds : incisors, canines and molars. The eight deciduous incisors, while they resemble their successors, are altogether narrower, shorter, thinner, and more scalpriform in their character than their representatives of the second set.

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* A fracture of the lower jaw is usually in this region, and the fracture is generally at the expense of the outer portion of the anterior and the inner portion of the posterior fragment; this is owing to the great depth of the cells of the canines and bicuspids, the mental foramen and the natural oblique division of the bone in this region, rendering the bone weak at this point. An undeveloped *dens sapientia* lodged at the base of the coronoid process is also an element of weakness at the angle of the jaw. In the extraction of teeth from either jaw they should always be inclined towards the line of weakness.

The four canine teeth of the first set are replaced by the four canines of the second, which are longer, thicker, and more angular than those of the first. The eight deciduous molars, with their double and triple roots, are replaced by eight conical or bicuspid teeth, with longer and, in most cases, single roots and with smaller and rounder crowns. These buccal teeth supply in children the place of the molars in the adult, and nature has formed their crowns accordingly, although on a much smaller scale, with this difference, however, that among the molars of the superior as well as the inferior maxillaries of the adult the first molar is always the largest, while with the deciduous molars the first one is constantly the smallest ; and in so far as the successors of the deciduous molars are concerned they are nearly of equal size, but always smaller than their predecessors. Thus we have twenty teeth in the maxillaries of a child from three to six years of age ; before three years they are not all present, and later they begin to be replaced by the permanent set.

(*To be concluded.*)

A course of study, says the *Independent Practitioner*, for a graduate in medicine in Belgium is seven years ; in Russia, five years ; in Denmark, seven years ; in France, four years ; in Italy, six years ; in Germany and Austria about four years, but the graduate must have a certificate of graduation from a public gymnasium or high school.

HOW TO DETECT A SALIVARY FISTULA.—In some cases it is matter of uncertainty what is the nature of the discharge and then the following test is useful :—A few drops of the suspected fluid is brought in contact with perchloride of iron upon a porcelain face, sulphocyanide of iron, of a pink-red colour, reveals itself, if saliva is present.

THERAPEUTIC INDICATIONS IN DENTAL CARIES.

By Le Dr. E. Magitot,*
Membre de la Société de Chirurgie Lauréat de l' Institut et cet.

Dental caries is, in most cases, preeminently a curable affection. This proposition is at the present day so well established as scarcely to need further proof.†

It may, however, prove useful to point out what are the therapeutic indications and rules to be observed for the various forms in which the lesion occurs.

Dental caries may be divided both as regards symptoms and treatment into three periods.

In the first there is superficial caries, *caries of the enamel* that is, when the process does not go deeper than the layer of enamel, reaching, but not penetrating the dentine.

In the second period, caries of the dentine occurs. Here the mischief has penetrated the enamel, and has attacked more or less deeply the dentine, but without having reached the central pulp cavity. The symptoms incident to this period differ sensibly according as the caries has invaded more or less, closely the pulp cavity.

In the third period, deep caries exists. This penetrating or central caries successively traverses the layer of enamel and the dentine, and finally opens the pulp cavity itself.

This last division of caries is again sub-divided according as the pulp is simply bare, is attacked by inflammatory changes or is destroyed.

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* Translated for the *British Journal of Dental Science.*

† Dr. Piekicwicz, in a statistical enquiry addressed to this subject, fixes the proportion of cures at 99 per cent., which leaves 1 per cent. of extractions. These extractions were, however, in many cases undertaken for complications following upon rather than for dental caries itself. See, Des limites thérapeutiques de la carie dentaire. Transact. of Internat Med. Congress, London, 1881, vol. III., p. 516.

With regard to the mechanism of the processes of caries, we must remember they comprise essentially the progressive destruction of the anatomical elements of the enamel and dentine. This destruction of tissue proceeds very gradually and is of the nature of a chemical action, and while it calls forth mechanical and physical resistance in the enamel and in the dentine, and more especially in the pulp, provokes a vital and organic reaction. This reaction is, in some cases, sufficiently vigorous to check the progress of the mischief and so produce a spontaneous cure. This takes place in the condition known as dry caries.

Under other circumstances, and much more frequently, these reactions are characterised by different secondary lesions which often give rise to suffering and complicate the initial lesion by accidents which differ in the severity of their symptoms.

Having adopted this general summary, it is proposed to consider the therapeutical side of the question in the following order :—

Firstly.—Indications and general rules.

Secondly. — Indications special to each of the three periods.

1. INDICATIONS AND GENERAL THERAPEUTIC RULES TO BE PURSUED IN DENTAL CARIES.

What we said concerning the nature and mechanism of the production of dental caries gives us accurate ideas for therapeutic indications. These will be directed, firstly, to the cure of the diverse accidents which dental caries gives rise to, and, secondly, to the conservation and restoration of the organ and the re-establishment of its functions.

In the first case, therapeutics do not offer any departure from the lines followed in rational treatment.

To assuage pain, opiates and local anæsthetics are employed. To exposed surfaces of sensitive tissues, such as dentine, astringents, caustics, and such like remedies are called for.

The end in view is always either to modify the anatomical constitution of the parts, or to induce molecular repair in the organ which may give rise to a kind of cicatrisation, in all respects similar to that which is produced in the case of certain phagedenic ulcerations, which nothing but such energetic modifications can stop.

Sometimes also we desire to destroy parts in which there is impairment of sensibility or excessive sensibility occasioned by the denudation of sensitive tissues.

If the invasion of the disease has left the central pulp exposed, an organ peculiarly vascular and nervous in fact of the nature of a papilla, the treatment may be restorative if the preservation be supposed possible : we remove the congestion, lessen the sensibility, and bring back the pulp's functional and physiological state ; that is to say, the production of dentine susceptive enough to partially repair the loss of the substance. Such are the indications.

If the pulp is so profoundly disorganised in a certain space, both on the surface and in depth as to be judged incapable of reparation, its destruction should be carried out by the employment of caustics, assisted or not, as the case may be, by certain mechanical manœuvres. This destruction of the pulp, by appropriate means which we shall point out farther on, becomes, in some cases, useless, the organ having disappeared spontaneously, in consequence of purulent discharge or gangrene. This destruction is either partial or total ; if it be partial, the fragments should be attacked by the same means as the entire organ. If it be total, the treatment can be greatly simplified, and, in absence of complications, temporary filling may closely follow those applications intended to test sensitiveness and tolerance of the definitive filling. It is necessary to say always in this last variety, complications are frequent, and almost all belong to certain phenomena of periostitis either simple or suppurative. To simple periostitis, apply opiates, bleeding, local revulsives, &c., *i.e.*, to to suppurating form, grafting, and drainage.

But this is not the place to treat of questions which relate to alveolar periostitis.

Again, in complications whether the result of disease or of our intervention, we can adopt the ordinary methods; neuralgic symptoms, whether remote or local, should be treated by internal or external therapeutic agents, hypodermic injection of morphia, and sulphate of quinine, in the intermitting forms, &c. Inflammatory phenomena necessitate the employment of local bleeding or surgical operations.

These are the general indications raised by initial impairment and the manifold symptoms which accompany or complicate it, but there are others of a higher order, and for which the knowledge of general medicine and hygiene are of great importance. We speak of morbid conditions, whether acute or chronic, diatheses hereditary or acquired, which are frequently the determining cause of caries.

We are prepared to admit that in some cases of isolated caries therapeutic means may fail to effect a cure, but they succeed in those cases of caries which attack a great number of teeth simultaneously where local indications will not suffice and the local therapeutic application fails before the intensity and persistence of some cause constantly misunderstood or neglected.

The circumstances to which we allude ought not to be unknown to the practitioner. These are, for example, the affections of the digestive tract in the regions of the thorax and abdomen, and we know at the present time what influence they exercise on the reaction of salivary fluids and of the mouth where they engender the true agents of the lesion of which we treat. In the severe fevers and in convalescence from them dental lesions appear both intense, and painful, and in all these cases rational methods of prophylaxis ought to have prevented their occurrence, We will cite also pregnancy when it is accompanied by gastric affections the influence of which in the production of caries is well known. There are also general morbid conditions, the complications of nutrition, and even the influence of certain medicaments employed, either in large doses or during a long period of time, the injurious action of which on the teeth is too often misunderstood by physicians.

We see from these considerations that there are a multitude of therapeutic indications which are presented to the practitioner who seeks to treat dental caries, but we must dwell for a time on these facts without going beneath the surface of this study and without reproducing considerations which have been developed elsewhere.

We reach now the second division of these general indications, namely, that of the preservation of the organ and the re-establishment of its function.

When by the employment of appropriate therapeutic appliances the lesion of caries and its complications are treated a two-fold new indication presents itself, it is to assure yourself definitely of the cure and repair the loss of substance. These two terms are confounded elsewhere in practice for the processes of reparation are ordinarily the same as those that ensure the continuance of the cure. We say, most often, for before establishing the principle of the reparation of the loss of substance, it is necessary to mention a method applicable to a few cases of caries it is true, but of absolute efficacy when applied to cases properly selected.

This method is that which consists in treating a superficial caries by the simple resection of the affected part. It should be understood that this applies to altogether superficial caries, and when it is seated in positions where this resection is not capable of causing any complication. We will return to it in treating of the special symptoms of the first period, to which it exclusively belongs.

With regard to the reparation of the loss of substance it rests on the practice of filling, so to speak. This operation, which we need not describe here, depends on certain indications which can be formulated in the following manner.

1. Make choice of a substance of density and sufficient resistance to supply the injured organ in its physical and functional *rôle*.

2. Apply this substance to the healthy regions of the tissue, without provoking from them any reaction.

But what is the principle on which rests the practice of resection, and that of stopping? In other words, how does the resection and stopping realize the formulated indications? This principle is isolation.

Resection acts by effacing an impaired part, and transforming into a smooth and polished surface a superficial caries; it acts by the stopping which restores to the injured organ the destroyed portion, it is by isolation that the cure is effected, that is to say, by the ulterior and definite removal of the remaining sound parts from the causes of disease, which persist and reproduce themselves.

How then is the process of preservation and reparation addressed to the local isolated part? It can, it is true, be repeated and varied following the manifold lesions. But even with these curative means it is necessary to give a certain latitude for their efficacy and duration, when the various injuries act under the influence of a general cause.

In other words the therapeutics of accidental caries consist in the application of local processes, while various carious caries relieve by the treatment, even general affections or diseases of which they are in reality but a manifestation.

To be continued.

A Directory of the Dentists practising in the State of Georgia has been issued.

The United States census for 1880 places the number of dentists in this country at 12,314; of these 61 are females. According to the *Dental Register* there are 2,637 males ranging in age from 16 to 59 years, and 54 females also of that class; 120 males are 60 years of age and over, one female also of this class. According to this there are about ten thousand male dentists of "uncertain age"; it is generally thought that this applies to women folks.

British Journal of Dental Science.

LONDON, MAY 1, 1886.

IS IT TRUE?

In a spirit of the worst taste, a firm of advertising dentists have produced a pamphlet which abounds; on the one hand with abuse of English dentists and their craft, and on the other with praise of the efficacy of the firm in question. As a rule we prefer to pass by such vain vapourings as unworthy of the consideration of sensible men, but upon the present occasion we feel constrained to bring forward some statements which, presumably, Messrs. Eskell and Webb believe, in order to inform these gentlemen that they have not only committed a grave breach of professional decorum, but have been led into launching broadcast assertions which have no foundation in fact. In common charity, we will hope Messrs. Eskell and Webb know nothing of English dentists or dentistry; although, alas, English dentists, at least those who travel in public conveyances, cannot fail to know the name at least of Messrs. Eskell. But, even assuming that English dentists and English dentistry are wholly unknown to the distinguished firm who carry on business in Bond Street, London, there can be no moral justification for their rash and vindictively untrue statements concerning the legitimate and cultured upholders of true English dentistry. Messrs. Eskell and Webb have favoured the public with their pamphlet, and must therefore be prepared to stand or fall by the verdict which they find will be passed upon those who go out of their way to vilify their professional brethren.

To commence with, we find the following assertion:—"The ordinary English dentists are men who have had no hospital education, in fact no opportunity of seeing thoroughly good operative or artistic dentistry, whose time has been spent in making artificial teeth in perfect rows in the laboratory or workroom of some other dentist, and having saved a little money, they start in practice themselves." It would be hard to conceive that there existed any person gifted with intelligence and who had had even the slightest acquaintance with English dentists, who could put together such a farrago of absurdities as are jammed into the above quotation. The ordinary English dentists are divisible into two classes, those who practice legally in virtue of their names appearing on the *Dental Register* and those who, being unregistered, are quacks, and in the eyes of English law are indictable for an offence under the Dentists' Act. In passing, we may mention we have failed to discover the names of Messrs. Eskell and Webb upon the register, at least as belonging to their shop in New Bond Street. In 1878, many persons having no claims to be considered *bona fide* dentists were allowed to register their names, while it would appear from the Secretary of the General Dental Defence Association those whose claims were genuine enough found themselves left out in the cold. Be this as it may, the present generation of dentists are practically all men holding qualifications, and in London are mostly incumbents of the L.D.S.R.C.S. Now, to any one less badly informed than Messrs. Eskell and Webb appear to be, this qualification gives earnest of careful hospital training and no mean amount of reading. But, not contented with the above libellous onslaught upon British dentists, the London Dental Hospitals are signalled out as recipients of a similar mendacious attack. These hospitals, of which we speak from personal knowledge, are, it is alleged, "a disgrace to the dentistry of England," because they allow the extraction of thousands of teeth which could be saved. It is not enough to say this statement is a tissue of untruth, considering the source whence it emanated one would naturally receive it with the utmost caution, it is right that we should point out how utterly wide of the truth these self-termed American dentists have placed themselves by indulging in such wholesale abuse. The London Dental Hospital, for it will suffice to refer to the older of the two

London Hospitals, has upon its staff the best known surgeons and dentists in England, men whose names are known and respected far beyond Europe, and comprises members of the teaching staffs of most, if not of all the general hospitals of London. The students are men who have passed through a crysalis stage of careful training in the workroom of some qualified dentist and who affiliated to some general hospital, in many cases win prizes in the preliminary subjects such as anatomy and physiology over the heads of the ordinary medical students, come to the Dental Hospital skilled and thoughtful students. The lectures and the practice of the hospital are open to any who will take the trouble to test the statements of Messrs. Eskell and Webb. The prevalent failing, if failing it can be called, is certainly a tendency to practice an over-conservative treatment to run risk rather than remove teeth which show the slightest chance of being saved. Nor is the choice of removing teeth left in the hands of the students. They form their own judgment, but it is the acting surgeon for the day who, assisted by the constant attendance of an experienced house-surgeon, finally decides in each case whether a tooth shall be saved or removed.

But enough, let us turn now on the American side of the question, but only for a moment. Let all remember that the genus quack, the dental charlatan is as rife among "American dentists" as in England. When dentists speak warmly and justly so of American dentists, they refer to the leading spirits in the transatlantic dental world and not to the sham D.D.S.'s of bogus dental colleges. The slur and stigma upon American dentistry, as witness the state dental laws, are the ignorance and bounce and bluster which characterise the bogus degreed gentry, of those whose sad fate may let them fall into the hands of such, well may it piously be ejaculated, "and may the Lord have mercy upon their *teeth*."

Where the shoe really pinches is that the excellent work done by the dental hospitals now attracts a number of persons who formerly fell into the hands of advertising dentists. Servants and needy clerks really the poorest section of society, because they have appearances to keep up, cannot afford the modest fees of competent practitioners, and so have but one resource, viz : the gentry who profess to do work worth five pounds for five shillings, or to go to the hospitals. The experience of others induces them to resort to the hospitals where they soon find they obtain the highest opinions and the best work.

So long as the authorities are most careful to restrict hospital charity to only the truly needy, there can be no question but that they are doing a great and good work and are slowly, but none the less surely, cutting the ground from under the feet of the charlatans who have too long preyed upon the unwary and distressed.

THE INTERNATIONAL MEDICAL CONGRESS.—Whatever may be the fate of the Dental and Oral Section of the Congress, it seems more than probable that a most influential meeting will take place in 1887. We heard of names as likely to hold office which must insure the respect and wide support of English surgeons and physicians. It will be a sad miscarriage if American dentists allow internecine conflicts to mar the chance of promoting a brilliant and effective dental section. Whatever may be said, there is no doubt that in Britain the medical and dental professions are so allied in interests and pursuits that the English dentists will be much more disposed to go over to America to attend a Dental Section of an International Medical Congress than they would be to put themselves out of the way to appear at an International Dental Congress. The Medical Congresses are *faits accomplis*, not so the Dental, at least in the eyes of the dental profession in England, so if we are to take part in the meetings of American dentists it will have to be at the Medical Congress. Many dentists will go across whether there is a section or not and will attend the Medical Congress. We will, therefore, trust the Dr. Taft's circular will carry out its assurances and we may all meet and compare notes before a brilliant Dental and Oral Section of the Ninth International Medical Congress. Such there certainly could be.

THE EDINBURGH DENTAL STUDENTS' SOCIETY. — The annual dinner of this society was held in the Albert Hotel, Hanover Street, on Friday evening, March 26th. Mr. Alexander Cormack presided, and Mr. J. Steward Durward acted as croupier. There were forty gentlemen present, and in every respect the gathering was highly successful. Among others present were :—Dr. Symington, Mr. J. Falconer King, W. Bowman Macleod, Mr. Andrew Wilson, Mr. J. Austin Biggs and Dr. W. Wilson. After the loyal toasts the chairman proposed "The Edinburgh Dental Students' Society," and Mr. J. Stewart Durward, the Society's vice-president, replied. Other toasts were:—"Kindred Societies," "The Dental Hospital," "The Lecturers," "The Chairman" and "The Secretary, Mr. Page." The proceedings were pleasantly varied by songs, pianoforte solos, etc.

APPLICATION FOR NEURALGIA.—Dr. Mayet has, says the *Gazette Hebdomadaire de Paris*, found the following formula of service in the treatment of neuralgic pains :—He takes of chloral and menthol of each, one part ; of cocoanut butter, two parts ; of spermaceti, four parts. This is applied to the painful spots. A like preparation has been successfully employed in frontal headache, it is in that case applied to the forehead.

AMONG remedies for dental neuralgia which have never been sufficiently grasped and incorporated into dental practice comes gelsemium. The tincture in five minim doses is one of the best remedies next, perhaps, to chloral.

COCAINE POISONING.—"A case of death from cocaine applied to relieve the pain of a decayed tooth is reported by Prof. R. Ogden Doremus to the New York Medico-Legal Society." The inverted commas are those of the *Dental Register* from which we quote. We ventured long ago to hint that cocaine, like other dogs, would have its day. It would seem that it will also have its holocaust of victims ere its reckless use is discountenanced.

Owing to the retirement of Mr. Moon a vacancy occurs on the staff of the London Dental Hospital. A vacancy for an assistant dental surgeon is also declared at the Middlesex Hospital.

Another way of Deodorising Iodoform.—We have from time to time offered hints upon this subject. We have now to present a further method due to Opplus, which consists in diluting the iodoform with half its bulk of finely-ground coffee. The coffee must be carefully ground and thoroughly mixed. It then not only disguises the objectional smell of the iodoform, but assists in its antiseptic action.

An English Investigation of Pasteur's Method of Antidoting Hydrophobia. — The following well-known scientists have been appointed by the Local Government Board to investigate M. Pasteur's methods :—Sir Henry Roscoe, M.P., the chemist ; Sir James Paget, Bart. ; Dr. Richard Quain, F.R.S. ; Professor Burdon Sanderson, F.R.S. ; Dr. Lander Brunton, F.R.S. ; Professor Victor Horsley, F.R.S., and Mr. Fleming, principal veterinary surgeon to the Army.

A Reason why Toothpicks Should be used with Caution.—A contemporary narrates how a certain farmer went to a chemist's shop where he saw displayed upon the counter certain little ivory tablets looking like toothpicks. They were "points" duly charged with vaccine virus for vaccination. However, the unconscious tiller of the soil proceeded to employ the same as a toothpick. The gums "took well," and that farmer, although protected from small-pox, was not a happy man for some time afterwards !

A New Hypnotic.—Urethan, an ethylic æther of carbamic acid, has been proposed as a sedative. We have had no experience of its use, but learn from those who have tried it that doses of ten grains taken at nightfall act satisfactorily.

Ancient Anæsthesia in China.—In examining the Chinese books in the National Library at Pekin, says the *Dental Luminary*, proof has been found that the Chinese surgeons have been long acquainted with the use of anæsthetics during surgical operations. Reference is made to a celebrated physician who flourished between the years 220 and 230 of our era. It states that he gave the patient a preparation of hemp (hachich), who, at the end of a few moments, became as insensible as if he had been drunk or deprived of life. After a certain number of days the patient was cured without having experienced the slightest pain during the operation.

"Be Earnest at Play as well as at Work."—It would form an interesting volume if one were to narrate the exploits of dentists when "far from the madding crowd" they disport themselves. In America dentists also "sport." Captain Carver, the well-known shot, one, we suppose, of the most remarkable ever produced, and Buschong, a great base baller, are both dentists.

Corundum which is in great demand by polishers, is principally obtained, says the *Dental Eclectic*, from the extensive deposits of that mineral in North and South Carolina. It is said that it cuts much faster and will do double the work of emery. The ordinary corundum is brittle, translucent, infusible before a blow pipe and insoluble in acids. It is the pure aluminia in the native crystalline state.

An Obtunder of Sensitive Dentine.—The same journal says:—Dr. J. Smith Dodge, jr., recommends a solution of menthol and alcohol as the best obtunder for softened and sensitive dentine that he has ever used. A drop in the cavity will take effect in three or five minutes, but sometimes a second drop is useful. It is also recommended for incipient periodontitis. The proportions are, two drachms of menthol to an ounce of alcohol.

THE MORAL EFFECT OF ARTIFICIAL TEETH.—In an exceedingly clever book called "King Soloman's Mines" the romantic adventures, are narrated, of three white men who are in search of the diamond mines of Soloman, of an invalid brother, and of sport. This trio find themselves suddenly face to face with the haughty Zulu tribe of Kukuanas, in fact they beard the swarthy warriors in their happy fighting fields. As a natural result the Blackamoors inform our trio politely, but firmly, that they must die. Now comes our 'moral.' The sportsman is discovered in the act of fixing a double set of artificial dentures, this startling revelation is to the poor Zulu warriors a certain proof of superhuman power, and so the hero of the movable teeth undergoes a rapid apotheosis. This simple device saves himself and his friends from a 'gentle death' at the hands of the Zulus. We should add that at the time of the discovery in question, Captain Good, for so he is called, is clothed in an eyeglass and minus his trousers, and it is hinted that the "transparent eye and the white legs" also possessed a "moral effect."

That useful periodical the British and Colonial Druggist has become a weekly publication. This change will greatly add to the value of the paper, and enable the editorial staff to bring forward much valuable material otherwise inevitably lost for "want of space."

WHO OUGHT TO TREAT NEURALGIA?—Correspondents are frequently asking whether they are justified in prescribing for the neuralgia of their patients. The question involves grave issues, as dentists would undoubtedly be held to be highly culpable were they to take upon themselves the functions of the medical attendant, and for these reasons: The dentist properly has only to deal with Odontalgia, or reflex or referred neuralgia, due to tooth irritation—all other forms of neuralgia although probably as easily cured by him as by anyone else, are outside his province. Neuralgia may be due to so many and so various conditions, quite outside tooth irritation, that a dentist would probably overlook the cause and merely treat the local effect, and by so doing incur a risk to his patient and himself.

The Dental Hospital of London.—The report of this hospital is now before us. We note with pleasure its increasing popularity and usefulness. Although £500 has been paid during the past year to remove the mortgage, £3,000 still remain to be grappled with, and seriously hampers the charity. Among the vice-presidents the name of the Right Honourable W. E. Gladstone appears.

The second Annual Report of the Victoria Dental Hospital, Manchester, shows that it is winning its way to the respect and confidence of the inhabitants of Manchester. The number of attendances have during the past year been quadrupled when compared with the record of 1884. The Hospital has become affiliated to Owens College Medical School. Lecturers upon dental subjects hold their classes in the College and give clinical instruction in the Victoria hospital. The increasing work done at the hospital has decided the authorities to appoint a house surgeon to attend to the staff and their patients. It is a matter of great satisfaction to us to see the success of the Dental hospitals in the provincial towns, their utility cannot be questioned, and they afford facilities for genuine and *bona fide* clinical and operative instruction, which could not otherwise fall within the range of most of the provincial students. In the time to come we have little doubt that they will compete with the London schools, and so maintain the high standard of teaching insisted upon in the special dental hospitals.

Filling and Treating Roots at One Sitting.—This is said to be effectually done by the application of heat. A fine wire heated to redness and inserted into the canal to the apical foramen—the application repeated according to circumstances—is all that is necessary. The common spirit-lamp may be used for heating the wire, but it loses its glow so quickly, in passing from the flame to the tooth, that considering the difficulty in many cases attending the insertion of the wire into the canal, more than ordinary dexterity is required for the successful accomplishment of the operation. Dr. Rogers, the expounder of this method, therefore resorted to the electric cautery, which can be deliberately placed at the orifice of the canal, when heated to incandescence, and quickly thrust into the entire depth of the root. A correspondent of the *Cosmos* gives full particulars of Dr. Rogers' plan.

For sensitive teeth, chloride of zinc is often used with good effect. It is used in crystals or allowed to deliquesce. In the latter state, kept in a glass stoppered bottle it is best. It should not be diluted. Carbonate of potassium is recommended for this purpose, and it is used with advantage by many. Dr. Flagg recommends that it be mixed with glycerine—about five grains to a drachm of glycerine, and allowed to stand till it becomes clear.

Abstracts of British & Foreign Journals.

THE INDEPENDENT PRACTITIONER.

ON CERTAIN GAS-FORMING BACTERIA OF THE ALIMENTARY CANAL, THEIR FATE IN THE STOMACH, AND THEIR REACTION ON DIFFERENT FOODS.

By Dr. W. D. Miller.

Two questions are put forward as requiring a solution: 1st. Are the micro-organisms taken into the stomach at any meal passed out or devitalized before the next meal, or does the stomach, of dyspeptics in particular, always contain fungi? 2nd. How is the quantity of gas generated by these fungi influenced by the kind of food taken?

To 1, experience points to the presence of micro-organisms at all times in the unhealthy stomach. This explains why starchy or saccharine foods cause the distention of the stomach from formation of gas. Dr. Miller has demonstrated that those fungi alone which may be swallowed with a piece of bread are certainly not capable of bringing about this distention.

Experimenting upon six dogs with reference to this point, he found in four of these dogs, all healthy, fed for two days on a mixed diet of meat, bread, milk and sugar, richly infected with the gas-producing bacteria referred to. Diarrhœa occurred in from 30 to 40 hours, and in two cases distension of the stomach was very marked. After the last feeding they were muzzled to prevent their eating, and killed after 2½, 6, 8 and 9 hours respectively. In every case, except the last, the four kinds of fungi administered were found in the stomach in great numbers, also in the large intestines ; but few were present in the duodenum. In two cases the reaction of the contents of the intestines was strongly sour throughout, in one case slightly sour, and in one only neutral or slightly alkaline. The remaining two dogs were treated in the same manner, except that the bread and sugar were omitted ; the result was the same. One of the dogs had profuse diarrhœa in 15 hours, and the intestines, six hours after feeding, were distended with gas, and the reaction strongly sour. In both cases the fungi were found in large numbers in the stomach, as well as in the intestines.

Hence, it appears from these experiments that these fungi can maintain their existence, even in the stomach of dogs, for 8 or 10 hours, and can thereby give rise to disturbance in the intestinal canal, and this, in spite of the gastric juice of the dog being 1½ times as strong as of man's, and from 1½ stronger in dyspepsia, living fungi are, therefore, constantly present in the stomach, and that many chronic troubles of the stomach are due, not alone to the micro-organisms which are at each meal taken in along with the food, but more particularly to those which are already in the stomach at the beginning of a meal.

Hence, we should sterilize the stomach before eating rather than to sterilize the food itself. Dr. Miller directs that antiseptics should not be given after a meal, or upon a full stomach, but upon an empty stomach, about 10 or 15 minutes before meal-time. To determine what action these fungi have upon digestion under conditions favorable to their development, Dr. Miller swallowed a full-grown test-tube culture of the *micrococcus aerogenes* immediately after a meal, consisting mainly of bread, potatoes and milk. A very disagreeable feeling of distension in the stomach and bowels appeared after about 1¼ hours ; after 30 hours he was attacked with diarrhœa, this was aborted by taking 60 drops of concentrated hydrochloric acid after a light breakfast. The effects of the fungi persisted for days, and on the fifth day they existed in the fæces.

To effect a solution of the second question he made the following experiments : 30 grains of the different kinds of food were mixed with 45 grains of saliva, 75 grains beef-extract peptone-gelatine which had been infected with *bacteria aerogene* added.

Each mixture was then poured into a separate test-tube, the level marked and placed at a temperature of 22° C. The amount of gas generated in the different tubes was measured by the rise in the surface line. After 19 experiments a table of comparative values was drawn up, bread being taken as the unit of comparison.

Carbo-hydrates produced gas largely. Albuminous foods only a trace. Bread and potatoes were great gas formers..

All kinds of sweet desserts, cakes, omelettes, pears, sweet apples, grapes, etc., etc., produce much gas. Cranberries and prunes produce no gas, unless mixed with meat.

He commends a diet for stomach-ailing patients of meat, eggs, fish, spinach, cheese, fresh lettuce, and small quantities of endives and sour cranberries.

The administration of an antiseptic before, and a digestive during or immediately after the meal, will materially aid the process of digestion.

SOME THOUGHTS AND EXPERIMENTS UPON EROSION.

By Edgar D. Swain, D.D.S.

Mechanical abrasion means a gradual loss of tooth substance due to allution of the teeth themselves or of foreign bodies upon them. Erosion signifies the action of a corrosive substance, or the destruction by a chemical agent, and applies equally well if the theory of destruction by micrococci be admitted.

Under erosion, are included the less familiar conditions, such as the gradual wasting of one or many teeth, the wasting of the anterior teeth upon their incisive edges, or the cutting of grooves across their labial surfaces, and sometimes regular and irregular patches upon their labial and proximal surfaces.

Under the first condition the anterior teeth generally present an elliptic-shaped space between the upper and lower incisors, when the back teeth are closed. In these cases mechanical forces cannot act since they cannot come in contact, and must be due either to insufficient nutrition, death of animal tissue and consequent falling to pieces of the mineral portion, or its destruction by some corrosive substance. The glands in the end of the tongue have been said to become diseased, and secrete a substance producing the erosion.

Teeth thus affected are never sensitive upon the eroded surface, the pulp seldom becomes exposed, secondary dentine appearing.

In cases where the labial surfaces of the anterior teeth are affected horizontally, about or just below the union of enamel and cementum, producing a groove or patch, there is no caries, no softened dentine. These cases cannot be due to mechanical causes.

The theories bearing on the point are reviewed.

Tomes holds to a mechanical origin.

Garretson a disease of predisposition, the result of impressions at the time of enamel development, or to electrolysis.

Fox, abnormal condition of the secretions of the oral cavity and friction of the lips.

Hunter believes it a disease inherent in the tooth.

Harris attributes it to acidulated buccal mucus.

Leber and Magitot regard leptothrix as the cause.

Mr. Chas. Tomes believes in the chemical theory that mucus, by fermenting, affords an acid solvent.

Bridgman's experiments are rehearsed. He placed in cold dilute sulphuric acid rods of pure zinc, amalgamated with freshly distilled mercury, one-half the rod immersed in the fluid while the other half remained in contact with the atmosphere.

In applying this theory to the teeth, he says : That portion of the tooth beneath the margins of the gums becomes the electro-positive, while the crown of the tooth is the electro-negative. The constant throwing off and decomposing of wornout epithelial cells and other foreign matter, with the saliva, provides the necessary acid fluid.

To test Bridgman's results when teeth were actually used Dr. Swain placed several teeth and a copper wire in a weak solution of sulphuric acid and water. The result upon the wire was a deposit of sulphate of copper, and upon the ends of the teeth (the crowns) exposed to the atmosphere, a deposit of sulphate of lime was found.

One of the teeth so used was prepared by cutting along its side a groove, which was filled with amalgam. No difference was seen between the chemical action upon this tooth and the others. Sufficient time was not consumed in these experiments to determine whether erosion could be artificially produced by this means.

As the solution was diluted daily during the last four days of the experiments, the deposits upon the teeth became more copious.

Bridgman does not recognise a vital resistive force existing in teeth in the jaws, and that the fluids surrounding the teeth at the margins of the gums constantly change.

Dr. Swain hints erosion may take place during sleep. He quotes a case where the lower incisors were severed to, and in one tooth beyond, the pulp cavity, was in a mouth were a tooth brush had never been used. It was attributed to cigarette smoking. The burning of paper, among other products, gives carbonic dioxide, which would naturally be a constant element in the mouth, and especially about the lower incisors.

Literary Notices and Selections.

THE ARSENICAL TREATMENT OF TOOTH PULPS.

By A. Morsman, M.D., D.D.S., Iowa City.

(*Continued from page 377.*)

Of course I do not mean the slight temporary ache that is produced by cold air or drinks. Indeed, that is to be looked upon rather as an indication of health than otherwise. Toothache, when the pulp is living, is indicative, usually, of inflammation in one of its stages, of that organ, and this condition is greatly aggravated by arsenical application. Time and comfort are both gained by first relieving the present symptoms. If only the stage of congestion has been reached, a gentle stream of water thrown against the sides of the cavity will often be sufficient to relieve the pain, and a cotton stopping that will protect from atmospheric changes may be all that is necessary as an application. Filling the cavity with chalk or soda is often an effective remedy. *Usually* more than this is required, especially if there has been nocturnal pains. We have a number of remedies to choose from

—carbolic acid, creosote, oil cloves, oil cinnamon, oil peppermint, menthol, hydrate of chloral, chloroform, opium or its preparations, camphor, and others that I do not remember. I have never been so uniformly successful with anything as with carbolic acid, either full strength or diluted with one of the oils. Whatever remedy is used, it should be allowed to remain in the tooth for twenty-four hours, and, to be effective must render the tooth painless during that time. If pulpitis exists, it must still be our effort to relieve pain, and to protect from thermal changes and pressure, but this is now much more difficult than in the preceeding stages, and we may run the gamut of remedies before we accomplish our purpose. Aconite and morphia are standard remedies here, and the two can be combined with most excellent results. Carbolic acid, creosote, and remedies of that class, are sometimes used with good effect, but it seems to me they are quite as frequently irritants. Rest and time are essential. Applications should not be changed oftener than every other day, unless there are exacerbations of severe pain.

Pulp ulcerations should be treated in the same manner, save that the stopping must not prevent the escape of pus. This is an unnecessary warning when cotton is used, but it is not so as to other temporary stoppings.

It should be borne in mind that a considerable degree of abnormality *may* exist without pain, and we are then dependent upon physical signs in making our diagnosis.

The usual methods of employing arsenic are as a paste and powder. The paste consists of arsenic, creosote, and morphine. The powder is the commercial arsenic. The paste is the most popular form, and I am at a loss to determine why, unless it is the too common reason that because the bell-wether jumped the fence, the other sheep followed. It is sticky and requires considerable dexterity to place accurately where desired. The morphine I believe to be an entirely useless ingredient, because the arsenic and creosote act first, closing the absorbents so effectually that no morphine can be taken up. What surgeon desirous of introducing a remedy by absorption would first cauterise the surface? The creosote acts as a pain obtunder, but is no more effective than oil of cloves, and is much more unpleasant. I do not like creosote. In my hands it is not nearly so effective as a pain obtunder as carbolic acid, and is about on a par with the essential oils. I speak, of course, of *pure* wood creosote. The commercial article is fully half carbolic acid, and is therefore just that much better than a pure article. A solution of carbolic acid in oil of cloves, or cinnamon, makes a very effective and not unpleasant remedy. It should be almost equal parts. If an application as mild as creosote is desired, I would prefer oil of cloves as being more acceptable and equally efficient. The profession has unfortunately fallen in the habit of creosoting everything in a way that is decidedly empirical. In using the paste, a small portion is taken upon the point of an instrument, or carried to the cavity upon a few fibers of cotton. The powder is used by moistening slightly a very small pellet of cotton in the obtunding solution, touching it lightly to the dry arsenic, and placing it in the cavity with pliers. There is usually enough arsenic adheres to the cork of the bottle for several applications. Only a very small portion of the drug is required, (about one-twentieth grain), and we use, as a matter of convenience simply, much more than is really necessary, and enough at times to be hurtful.

In regard to preparing a cavity for an arsenical application, I should make it a rule never to give pain. We should be satisfied to syringe with lukewarm water, and to lightly detach loose pieces of debris, leaving the excavating to be done when it can be done without pain. The walls of the cavity should never be broken down except when necessary to gain access.

Having now placed the arsenic in position, our next care is to keep it there. In a cavity with four walls, neither of which impinges upon the gum, this is a very simple matter, bearing in mind, however, that the material used as a stopping must, while it keeps the medicine in the cavity, be sufficiently porous to permit the escape of gases formed by the decomposing of the pulp. This is essential, because patients often fail to keep appointments, and we are obliged to guard against their negligence as well as against incidental danger. Periostitis from decomposing pulp is a serious complication both to patient and operator. There need be no effort made to keep the saliva out of the cavity; the arsenic is but sparingly soluble, and its mechanical retention is all that is necessary. For this class of cavities, a cotton plug is the most efficient means we have.

(To be continued.)

Dental News.

MEDICAL SICKNESS, ANNUITY, AND LIFE-ASSURANCE SOCIETY.

The quarterly combined meeting of the Executive and General Committees of this Society was held on Wednesday, April 14th, at 38 Wimpole Street, W. Mr. Ernest Hart presided, and there were present: Dr. W. M. Ord, Dr. T. M. Dolan (Halifax), Mr. T. V. Jackson (Wolverhampton), Mr. S. W. Sibley, Mr. F. Wallace, Mr. M. Greenwood, jun., Dr. R. Lord, Mr. J. Brindley James, Mr. E. Bartlett, Dr. G. W. Crowe (Worcester), and Mr. E. Noble Smith.

The quarterly report showed that the income for the three months ended March 31st had been £1,907 12s. 9d., of which £125 12s. 4d. was interest on investments. The total expenditure had been £708 7s. 8d., leaving an increase of £1,199 5s. 1d. on the quarter, and £4,904 5s. 10d. on the year. Altogether, premiums for two years had now been received, and the Society during that period had accumulated reserves of £10,228 9s. 3d. Of this, £9,174 was profitably and securely invested, and it was resolved to place a further £500 in Corporation Stocks. Steady progress continued, there having been thirty-one new members enrolled during the quarter.

Among the items of expenditure were sums of £200 and £100 on account of life-assurances, both having been paid immediately on the production of probate, and within one month of the deaths. For sickness, £323 8s. had been paid to thirty-six members, on acccount of 113 weeks' sickness. Many of the claims were for short, sudden sicknesses, due to the recent severe weather, and there were two for accidents. The members claiming were widely distributed remittances having been sent to London, Wales, Scotland, Liverpool, Suffolk, Brighton, Manchester, Kent, Yorkshire, Newcastle, Buxton, Surrey, Malvern, Lancashire, Shropshire, Norfolk, Plymouth, Basingstoke, Bolton, Essex, Birmingham, Cornwall, etc. Although a substantial sum had been expended for sickness, the average rate of claim was considerably less than the tables provided for. Since the commencement, £1,850 had been paid to sick members, leaving a reserve, under that head, of £4,566. In connection with this branch of the work, it was stated that two new companies (probably attracted by the success of the Society) had been started, providing sick-insurances, but not confined to the medical profession. A comparison of the tables issued showed the rates charged to be considerably higher than those of this Society.

In view of the annual general meeting, to be held at Brighton in August next, a discussion took place as to certain alterations in the rules. It was ultimately resolved to recommend a modification of the annuity system, so as to take in the lives of members' wives, and in other ways popularise this branch, which was considered an important one ; to make life-assurances operative as soon as membership is complete, instead of deferring them for twelve months ; and to take power for investments in the stocks of the British Colonial Governments.

The principles and work of the Society are set out in detail in its last annual report, copies of which, with rates, forms of proposal, and all information, may be had of the Secretary, Mr. C. J. Radley, 26, Wynne Road, Brixton, London, S.W.

VACANCY.

Dental Hospital of London, Leicester Square.—Dental Surgeon. Applications by May 10th, to G. A. Ibbetson.

APPOINTMENT.

Mr. W. H. Nicholls, L.D.S.I., has been appointed Dental Surgeon to the Monmouth General Hospital.

WORK DONE AT THE LONDON DENTAL HOSPITAL

During the Month of March, 1886.

Extractions	Adults	961
	Under 14	350
	Anæsthetics	603
Stoppings.—	Gold	381
	Other Stoppings	949
	Advice	120
	Irregularities	182
	Miscellaneous	358
	Total	3904

H. Lloyd Williams, M.R.C.S., L.D.S., House Surgeon.

ERRATA.

In Mr. Dougan's article on Pivoting in our number of April 15th, the following errors of the press have been overlooked.

Page 345—The Bonwill Foster should be The Bonwill, Foster.

Same page—After gum, full stop and cap A wanted instead of comma and small a.

Same page—After impression, full stop and cap A wanted instead of comma and small a.

Page 357, top—for nerve bridle should read nerve bristle.

Page 349, middle, for All the objections, read All these objections.

Page 349, end—for How. While read How, while.

Page 350, middle—for but they will better, read but that they will be better.

British Journal of Dental Science.

No. 440. LONDON, MAY 15, 1886. VOL. XXIX

PLASTIC OPERATIONS FOR RESTORATION OF THE UPPER LIP AFTER REMOVAL OF EPITHELIOMA.*

By Fred Bowreman Jessett, F.R.C.S., Surgeon to the Cancer Hospital, Brompton.

Plastic operations of all kinds are of the greatest possible interest to the surgeon, as well as of great importance to those who, whether by accident or disease, have the misfortune to require the aid of surgery to restore some portion of the body that has been destroyed.

This applies with greater force to plastic operations about the face, when the ingenuity of the surgeon is often taxed to its utmost to restore some portion of the visage without interfering materially with the expression of the face generally. Fortunately here nature assists us, as the vascular supply is so free that parts very readily unite after being detached from one part of the face, and fixed in a new position.

Cheiloplastic operations are of peculiar interest, as they are more frequently necessary, through the invasion of the lips by disease, epithelioma, syphilitic ulceration, bruises, and other accidents, than any other part of the face ; the results of the operations here also are most satisfactory.

But what we have to deal with to-day is especially the restoration of the upper lip, and here much more care and ingenuity is required than in renewing deficiencies in the lower lip, as the integuments at our disposal are not so plentiful, or so easily adapted, and the risk of considerably altering the expression of the mouth is very great.

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* Read before the West Kent Branch of British Medical Association.

A case which came recently under my care at the Cancer hospital, was that of a man, aged fifty-one, who had the whole of the upper lip, the right ala of the inside portion of the cheek, and the anterior part of the septum nasi destroyed by epitheliomatous ulceration, the gums were somewhat implicated also. The edges of the ulcer were everted and hard, while the ulcer itself was eroded, very vascular, and presented all the appearances of epithelial cancer.

There was no family history of cancer. He had had syphilis some years previously, from which, however, he had quite recovered.

There was no glandular affection.

He was treated, in the first instance, with large doses of Iodide of Potassium, with the faint hope that the disease might be specific. No improvement taking place after a fortnight's treatment, it was agreed that the disease should be freely removed, and an attempt made to form a new upper lip.

On November 7th, 1885, the patient having been put thoroughly under the influence of æther, I removed the whole of the diseased parts, cutting well into the healthy tissues. The right ala nasi was also included in the parts removed. I then, having previously cut a piece of paper the size and shape of the wound, placed this on the outer side of angle of the mouth, on the right side, and the same on the left side, and marked the two flaps intended to form the new lip, with ink on the cheek, and as low down over the inferior maxillary teeth as was necessary. (The dotted line in figure 3, will shew more distinctly than I can explain, the position of the incision used to form these flaps.) I divided the integuments, there marked out quite through the cheek, the flaps thus formed were twisted upon themselves, so that the extremities of each flap met in the middle line ; these were united with hare-lip pins, care being taken to get the lower ends of each flap in a direct line. The remainder of the flaps were then accurately fitted to the edges of the wound, the result of the removal of the disease, and fastened at intervals with silver wire sutures, the intermedial parts being adjusted by means of horse hair sutures.

The lower lip was then fastened at each end with wire sutures, so as to be exactly in the middlc of the cut surface of the new upper lip. The spaces caused by the removal of the flaps were brought together with hare-lip pins, and inter rupted sutures, and the whole of the united edges were painted over with collodion.

The mucous membrane of the newly-formed lip was carefully stitched to the skin, so as not to leave a raw surface, and also painted over with collodion.

The patient was fed for the first few days by means of a tube and feeding cup.

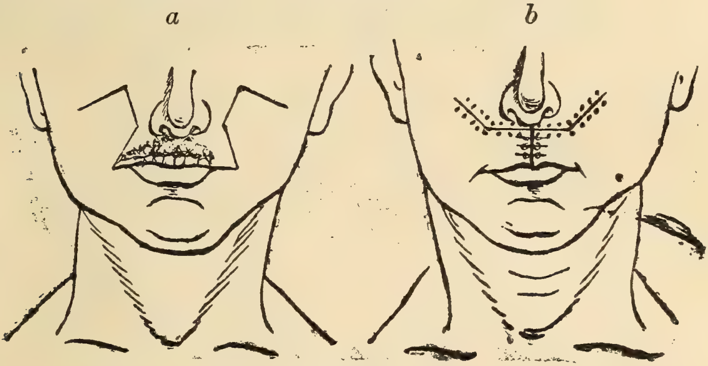

FIG. 1.

The pins were removed from the lip on the fourth day, when the edges were formed to the firmly united, excepting at the lower angle of the right flap, where a small portion had sloughed. The patient is now quite recovered, and the features rapidly assuming a more natural appearance.

The operations for the complete destruction of the upper lip that may be practised, and admirable results follow are shewn in the diagrams.

Fig. 1 represents the flaps taken from the cheek. The diseased parts being removed, an incision is made upward, and inclined slightly outwards on either side of the nose, and from the extremity of this incision another is made at right angles to it, extending outwards as far as the outer side of the malar bone. These flaps are dissected up, and the edges of the first incision united at the middle line by hare-lip pins. The triangular space, necessarily left on each cheek, is closed by loosening the tissues of the cheek, and fastening it by means of hare-lip pins, as shown in the diagram, No. 1, *b*.

Dieffenbach suggested and practised the operation represented in diagram No. 2. The diseased parts being removed, an incision upwards is made in continuation of the angle of the mouth for a distance equal to half the length of the upper lip on either side of the face, this is extended outwards at right angles. The length of this incision must be guided by the depth of the lip to be restored ; a final incision is now made at right angles to the last, and extending from the external extremity to a point in a line with the lower part of the ala nasi. The two flaps thus fashioned are to be dissected up, and being twisted inwards, are brought together in the middle line and united with hare-lip pins ; the spaces left on each cheek being similarly treated.

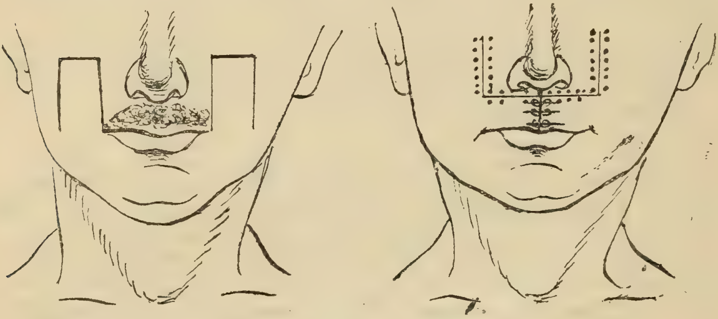

Fig. 2.

No. 3 represents the operation which I adopted in the case I have related to you. The operation is commonly known as Leidillott's. The flaps in this operation are fastened exactly in the same way as Dieffenbach's, only, instead of the flaps being taken from the cheek above the line of the mouth they are made, as you will see, entirely from the skin and integuments below that line.

It is obvious that each of these operations are applicable to cancer cases only. If the integuments of the cheek or ala of the nose are invaded by the disease, it is clear that it would be impossible to fashion the flaps to form the new lip from these parts. Again, in very thin subjects where the skin, as one so often finds to be the case, is drawn tightly over the molar bones, it would be impossible to form the flaps from the cheek.

In both these instances, then, the surgeon must perform Leidillot's operation if he hopes to obtain good results.

On the other hand, the operation is not applicable to cases where the disease has extended to the angle of the mouth, and the integuments below that line, here either of the two first operations might be practised, and preference should be given to Dieffenbach's operation, as the wounded surfaces caused by the removal of the flaps are brought together in a vertical direction, and thus the risk of ectropion of the lower eyelid being caused by the union of the cut edges is avoided. Whereas, in the operation depicted in Fig. 1, the cut edges of the triangular spaces caused by the removal of the flap, are united nearly longitudinally, and I should fear very much that the lower eyelid, probably, would be drawn down in many cases and ectropion would result.

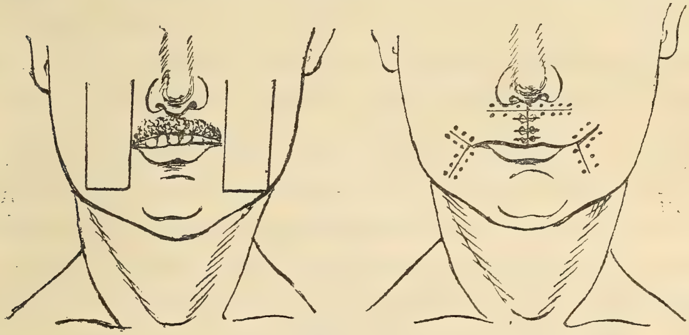

FIG. 3.

There have been other operations proposed and practised for the *partial* destruction of the upper lip that may be of interest to allude to.

Thus, Dieffenbach advised the making an S-shaped incision on each side of the ala of the nose, and detaching the flaps thus made, bringing them together in the middle line by means of ordinary hare lip pins and twisted sutures.

This operation answers admirably when the tissues are destroyed in a limited area of the lip and adjacent tissues, but it is obvious, if much of the lip is destroyed, the mouth would be considerably contracted by the operation.

In cases in which the surface of the lip has been partially destroyed, possibly along its whole length, thereby diminishing the depth of the lip. The late Mr. Teale, of Leeds, practised making a long, crucial incision, having its point intersection immediately below the septum of the nose. Each limb of the incision is about one inch-and-a-half in length. The two limbs on either side diverge moderately as they pass outward to the cheeks, and enclose between them an acutely angular flap of skin and other tissue. The crucial incision is extended deeply through the entire substance of the imperfect lip, and cheek. The parts implicated in the incision are then freely loosened from the attachment of the superior maxillary bone, by passing the knife beneath the flap close to the bone. The integuments being thus detached and loosened, the two lateral angular flaps are drawn across the median line, dovetailing with each other, and thereby increasing the depth of the lip at the expense of the breadth. The flaps are retained in position by an hare lip pin and twisted suture, and one or two fine horse hair or catgut sutures.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

[After the transaction of the usual business, the following instructive Cases were read and discussed.]

CASES IN PRACTICE.

The President related the following case which had come under his notice that morning. A lady came to consult him with reference to a lower partial denture, which had been made for her five or six years ago, but which for two years past she had been unable to remove from the mouth. It carried the four lower incisors mounted on vulcanite, but was so incrusted with tartar that it was impossible to tell what it was made of until after its removal. It had originally been secured by wire bands to the adjacent canines, but these teeth soon loosened and came out ; the patient, however, still continued to wear the plate, which she managed to retain in place by the muscular pressure of the lower lip. As the result of this pressure the mucous membrane opposite the spaces where the canines had been, became greatly hypertrophied, and the spaces became filled by two large masses composed of swollen and hypertrophied mucous and fibrous tissue. On the right side the mass had completely surrounded the wire band, which appeared to perforate it, and the plate could not be removed until this had been divided. Mr. White said he had never met with a precisely similar case, and thought, therefore, that it might be interesting to this Society.

Dr. Walker exhibited a very instructive series of specimens illustrating the various stages and adaptations of Continuous Gum Work, and commented upon them.

Every member of the Society must, he said, have at least a theoretical acquaintance with the preparation of continuous gum work, since it was described in every text-book. But in this, as in most other processes, practical success depended on attention to a number of details ; hence an inspection of the specimens he had to show, illustrating the various stages of manipulation as carried out by means of Verrier's furnace, might be useful to some of those present, though he had nothing new or original to bring forward. He thought the thanks of the profession were due to Mr. Verrier for his furnace, by means of which it was now possible to prepare partial or full continuous gum dentures with but little expenditure of time. With this furnace he (Dr. Walker) was able to obtain what he considered, and what he hoped those present would consider, very satisfactory results.

The principal objection which had been brought against continuous gum work were the alleged difficulty of repairing or adding to a denture, and its weight. He would hand round specimens showing that it was quite possible to repair or add to a continuous gum denture, and would call attention to the lightness of the combined work,—vulcanite denture with continuous gum mountings,—prepared according to Mr. Balkwill's method. Some practitioners also complained of finding it difficult to get an accurate fit; he had therefore placed some of the cases on the models to show the fit.

He had used several makes of gum body and enamel—American, German, and English. The latter, supplied by Messrs. Ash, he had as yet used only a few times, but had found it quite satisfactory. With the American composition of the S.S. White Company, American teeth must be used, but Messrs. Ash's teeth could be used with their gum body and enamel, which fused at a somewhat lower temperature than the American.

Dr. Walker then proceeded to show the various stages of the work as applied to partial plate-mounted dentures, partial bar-mounted dentures, and full sets, the mode of fixing the teeth, applying the gum body, firing and enamelling. The colour of the finished denture depended partly on the make of the enamel, but chiefly on the quantity used. Thus, if a light colour was required, only a thin coating of enamel should be applied, whilst for a deep colour a thicker coating should be given, or several coatings with a firing between each.

To prevent cracking of the enamel in the case of full dentures a platina lining should be adjusted to the back of the teeth after they are set up, and the pins of the teeth bent over the upper edge. The lower third of this lining is cut into sections, which are bent alternately to the outer ridge of the alveolus and to the inner circle of the palate. By this means the effects of the expansion of the metal by heat and its contraction on cooling are equalised, and since he had adopted it he had not had one cracked tooth.

He had discarded the use of the platina table in the muffle, and now surrounded the denture in the muffle with powdered silex. In the case of a full denture it was not advisable to attempt to fire the whole at one heating. It was better to fuse the alveolar border first, then to reverse the position of the piece in the muffle and fire again to fuse the palate.

He should be very pleased to give further particulars, and to answer any questions respecting the management of the furnace, gas supply, &c., after the meeting.

The President said it was certainly very beautiful work, but it seemed to him that there was a difficulty in making alterations and repairs, at all events as compared with other descriptions of work, and that this was a drawback. He had, however, to confess that he had never tried it himself, and he should be glad to hear the opinions of those who had a practical acquaintance with it.

Mr. Walter Coffin said he had found continuous gum work very satisfactory for partial plates, but had always failed in his attempts to make a complete denture, owing to the difficulty of getting it properly and evenly fused. He had to thank Dr. Walker for showing him how to overcome this difficulty.

Dr. Geo. Cunningham remarked that when he brought the subject before the Society earlier in the session it was to complain of his failures, but he was happy to say that since then he had been more successful. He had suggested that the gum body supplied by the S.S. White Company must be different from that which he had previously obtained from them, and this he found was actually the case. They had been in the habit of selling a preparation made by Dr. Close, of New York, but lately they had taken to make it themselves, and no doubt the two were not quite identical in composition. Unfortunately the materials required in continuous gum work were troublesome to prepare for oneself, and it was therefore necessary to rely on those supplied by the depôts.

Dr. Walker had suggested that his failure had been caused by deficient gas supply, but this he found not to be the case.

In fact, his supply was fully equal to what Dr. Walker had said was necessary. The S.S. White Company, to whom he had written, replied that the "checking" of which he complained would occasionally occur under all circumstances, and that they were quite at a loss to explain it. With regard to the case which he had mentioned at the January meeting as having turned out so bad a colour, he had set a boy to grind off the enamel, re-enamelled it, and fired twice as Dr. Walker had recommended, first with the molars to the front, and then to the back of the furnace, and the result was most satisfactory. In fact, the patient was so pleased with it that he could not be induced to part with it even for the purpose of showing it at that meeting.

He quite agreed with Dr. Walker as to the wisdom of discarding the false floor of the muffle, and he had heard that Mr. Verrier had himself given it up.

Dr. Walker, in reply, said that alterations and repairs could be effected in this description of work without remaking, and without any great difficulty. He had himself found that Dr. Allen's gum body, obtained from the S.S. White Company, gave a different result after being kept a year from that which it gave when fresh. All the same, though the composition of the materials was given in Harris's book, he did not think it was worth while for any practitioner to attempt to make them for himself.

Mr. Walter Coffin showed models of a regulation case treated by his brother, Mr. Harold Coffin, by means of an expansion plate, which was interesting on account of the very successful result obtained under what appeared at first to be most unfavourable conditions, especially considering the age of the patient.

The patient, an Oxford undergraduate, in his twenty-fifth year, had great narrowing of the arch in the premolar region; indeed the falling in was so marked on one side, where the canine was forced completely outside the arch, as to cause a decided malformation of the face. To have extracted the canine, as he thought many practitioners would have done, would have aggravated the deformity. As the result of five months' treatment the teeth had been expanded into line and the appearance of the patient very greatly improved.

The President said he agreed with Mr. Coffin in thinking that most practitioners would have begun by extracting the misplaced canine. The result obtained was certainly most satisfactory, and should encourage others to persevere in the use of the expansion plate even in apparently unpromising cases.

Dr. St. George Elliott showed several contrivances which he had found useful in practice. One was a small parafine lamp, over which a tumbler could be placed ; it would burn for a long time, and the temperature of the water did not vary more than 6° Fahr. A rotary knife fitted to the dental engine for cutting crystal gold ; points made of raw hide, which was tougher than leather, for polishing gold fillings ; and a neat little oil can made of celluloid with platinum nozzle.

The President thanked Dr. Elliott for giving him a very useful hint with reference to cutting crystal gold. He had been in the habit of tearing it, but Dr. Elliott's plan was much neater, and he should certainly adopt it.

Dr. Geo. Cunningham (Cambridge) read notes of a case of tetanus supposed to have been caused by dental irritation.

The patient was a healthy muscular Cambridge undergraduate, aged nineteen. Early in November, whilst eating some meat, he bit up a fragment of bone which was driven into a carious cavity in the left upper first molar, causing extreme pain of short duration. A few weeks afterwards he returned home for the Christmas vacation and went about a good deal. On January 20th he rode home from a dance outside a cab, the night being bitterly cold. Next day he had a good deal of pain in the carious molar, and went to the family dentist, who filled the cavity (mesial crown, of medium size) with amalgam. Next day (January 22nd) he returned to Cambridge, and on the 25th felt a stiffness in his lower jaw. As this stiffness continued he (on the 29th) consulted

Mr. Geo. Wherry, of Cambridge, who did not then consider the case a serious one. On the 31st, the symptoms having become more marked, he consulted Mr. Wherry again. He complained of pain on the left side of the face, and pain and difficulty in moving the lower jaw caused by contraction of the masticatory muscles. He could open his mouth, but not widely. Mr. Wherry, thinking the spasm might be due to an impacted wisdom tooth, sent the patient to Dr. Cunningham. Dr. Cunningham found the teeth strong and very free from decay, but much crowded. A careful examination convinced him that the trouble was not due to the wisdom teeth. The left upper first molar was found to be slightly sensitive to percussion, and had been the seat of slight localised pain, so the amalgam filling was removed and a minute exposure of the pulp was discovered. A dressing of carbolised resin was applied.

This, however, had no effect on the progress of the trismus. On February 3rd there was marked spasm of the facial muscles (*risus sardonicus*), and the patient stated that though he could swallow liquids well he had been unable during the last two days to swallow any solid food. On the 5th the spasms had extended to the muscles of the neck, thorax, and abdomen, and it was decided to extract the tooth which was suspected of having caused the mischief ; this was done under chloroform, the corresponding lower molar being also extracted. The disease, however, continued to progress. The muscles of the chest, abdomen, and back were involved, and violent fits occurred in which all the muscles of the trunk and limbs seemed to be contracted with the severe pain which accompanies cramp.

For some days the patient remained in a critical state, but was able to take fluid nourishment, and his strength was thus fairly maintained. The contraction of the masticatory and facial muscles was evident even during sleep ; on two occasions he bit his tongue badly. The general spasms were often brought on by attempts to talk, to pass water, or to relieve the bowels. The temperature was never very high. During the third week the spasms extended to the legs and thighs, following therefore the same order as is seen in rigor mortis. The patient then began to improve and slowly recovered.

The treatment pursued consisted of rest in bed, chloral hydrate internally to relieve spasm, and extract of belladonna externally, applied hot to the jaws and neck. Great attention was also paid to the diet—milk, beef-tea, raw beef juice, cream, beaten-up eggs, &c., were administered at frequent intervals. The tooth was extracted to remove a possible source of irritation.

Whether the case was of idiopathic or traumatic origin must be considered an open question, and he (Dr. Cunningham) should be glad to hear the opinion of members on this point.

Mr. Storer Bennett asked whether Dr. Cunningham had examined the pulp after the tooth had been extracted, and whether there was anything sufficiently wrong with it to assist in accounting for the origin of the malady.

Mr. Betts remarked that pathologists appeared to be very uncertain as to the causes of tetanus. Laceration of a nerve seemed to be the most common cause, and it was possible that in this case the disease might have been originated by the irritation set up by the spiculum of bone. Considering, however, that irritation and laceration of nerves was a common occurrence in dental practice, it was remarkable that tetanus should be so rarely met with.

The President remarked that the case was of great interest, since tetanus was an occasional, though rare, consequence of dental irritation. Still, his own opinion of this particular case was that the facts pointed to idiopathic rather than to dental origin of the disease.

Dr. Cunningham replied that so far as could be judged from a naked eye examination of the pulp it was not greatly altered—it appeared congested only. The exposure of the pulp was very minute, and he did not think that any actual laceration could have been caused by the fragment of bone. The fact that extraction of the tooth was not at once followed by the amelioration of the symptoms was no proof that the disease was not of dental origin, since the disease when once set up was not easily quieted. But whether the dental lesion was the cause of the disease or not, he thought it was bad practice to put in an amalgam filling in such close proximity with the pulp without the intervention of any non-conducting material.

Mr. C. J. Boyd Wallis then read notes of the following case of facial neuralgia and spasm, illustrating the suffering that may arise from diseased and neglected teeth.

A lady, aged thirty-two, thin and pale, and evidently in delicate health, was sent to him by a medical friend for advice concerning her teeth. She stated she had been suffering severely for some time from neuralgia with occasional pain in one or other of her molar teeth, all of which were more or less decayed. In addition to the neuralgia there was contraction of the muscles of the right side of the face, the nose being drawn to the right, with loss of power in the eyelid and some loss of sensation over the side of the face and extending down the outer side of the right arm. Tonics and change of air had been tried with little or no benefit.

Upon examination of the mouth Mr. Wallis at once advised the removal of the right upper second molar—which was abscessed—and the root of the third molar ; the right lower second bicuspid, left upper molar roots, and lower wisdom tooth ; they were accordingly extracted under gas and ether. All of them were completely broken down with decay ; but though the pain about the head and neck had been more or less constant during the previous six weeks, it had not been localised to any one tooth for more than a few minutes at a time. Mr. Wallis therefore decided to remove the teeth which were most useless and most likely to be giving rise to reflex nerve irritation.

The patient was advised to continue for a short time longer the tonic ordered by her medical attendant, and shortly afterwards wrote to say that she was quite free from pain, her face had regained its normal condition, and her general health had greatly improved.

Mr. W. A. Maggs read notes of two cases of Epulis treated by ligature.

Case 1.—He was consulted by a young lady, aged twenty concerning a growth connected with the left side of her lower jaw which was termed "Cancer" by her regular medical attendant. It sprang from a point between a root of the first permanent molar and the second temporary molar, which still persisted. The growth was about the size of a walnut, lobulated and pedunculated; its surface was ulcerated from contact with the opposing upper teeth, and there was some inflammation about the base.

Mr. Maggs extracted the temporary molar, and the adjoining stump, put a double ligature round the peduncle, and told the patient to return in three days' time. By that time the growth had sloughed away, only the ligature remaining. Mr. Maggs removed this, applied solid nitrate of silver to the part and ordered a mouth wash containing chloride of zinc. The treatment was perfectly successful.

Case 2.—A gentleman, aged fifty, sought Mr. Maggs' advice respecting a growth springing from the region of the left upper second bicuspid. He had previously consulted two medical men, neither of whom would venture on a diagnosis. The growth was about the size of a filbert, and slightly pedunculated. The teeth on either side of the second bicuspid had been extracted some years before. Mr. Maggs removed the tooth and applied ligatures to the base of the tumour as in the previous case, and the treatment was equally successful.

He regretted that he had been unable to determine microscopically the structure of these tumours, but he assumed that they were of the ordinary fibrous description. And seeing that the great majority of such cases were of this nature, was it not wiser to adopt some such simple mode of procedure as that described, rather than the excision of the alveolus which was usually considered the only sound treatment? He had a vivid recollection of the formidable operation, and excessive hæmorrhage, that usually attended the removal of such growths at the hospitals, and it appeared to him that if such heroic means were necessary, it should only be in cases where the ligature had failed. In each of these cases nearly two years had elapsed, and there had been no recurrence.

The President said he was disposed to agree with Mr. Maggs in protesting against the adoption of heroic treatment in all cases of epulis. No doubt the use of the bone forceps, actual cautery, &c., was sometimes necessary, but cases did often occur in which, as Mr. Maggs had pointed out, simpler measures would suffice, and it was well, therefore, that some discretion should be used, and that all should not be condemned to undergo a somewhat severe operation as a matter of course.

Mr. Betts remarked that Mr. Maggs was fortunate in meeting with predunculated tumours ; they were more often sessile, and then the ligature was not applicable. In such cases he had found the application of ethylate of sodium very satisfactory ; it destroyed the growth and caused no pain. In one case the application was followed by some hæmorrhage, which was arrested by styptics, but three applications of the ethylate completely removed the tumour, and there had been no recurrence.

Mr. Hepburn thought that the growths spoken of by Mr. Maggs were rather of the nature of polypi than of epulis. The former might safely be excised, and if the source of irritation was removed there was little chance of recurrence. But in the case of epiloid growths it was necessary not only to remove the root or tooth which appeared to have given rise to it, but also thoroughly to clear out the socket whence it came

Dr. Walker mentioned the case of a lady who suffered during four successive pregnancies from a vascular granulating growth of an epuloid character ; there was frequent and very troublesome hæmorrhage. Dr. Walker managed to keep the growth in check by means of chloride of zinc. In the intervals between the pregnancies it was quite quiescent and caused no inconvenience.

Dr. Cunningham thought that Mr. Maggs applied the word epulis to something very different from what was usually understood by that term. As regards epulis proper he was of opinion that mild treatment was not only useless, but seemed generally to aggravate the disease. As an instance of this he referred to a case in which his late partner excised an epulis and it recurred within a year in a worse form.

Mr. Storer Bennett said it was a fact well established by experience that mild operations were of no use in cases of true epulis; it was necessary not only to remove the growth, but also the portion of periosteum whence it sprang. What Mr. Maggs had spoken of as "epulis" were evidently cases of simple hypertrophy of the gums, which were easily treated. It was specially important to guard against all chances of recurrence in a case of epulis occurring in a person of middle age, such as Mr. Magg's second patient, since if a recurrence did take place under these circumstances it was very likely to be of a more malignant character than the original growth.

Dr. St. George Elliott remarked that most of the previous speakers had admitted that some fibrous tumours of the gum might be successfully got rid of by comparatively simple treatment, though they asserted that others required what was, to the patient at least, a decidedly formidable operation. But who was to decide what the operation was to be? He would instance the case of a young lady who consulted a well-known London hospital surgeon with reference to an epulis over the left upper lateral. He told her that it must be excised. The patient then applied to him (Dr. Elliott); he painted it two or three times with ethylate of sodium, and at the end of a month the tumour had completely disappeared and did not return.

Mr. Hern thought that as a rule the so-called "heroic" treatment was best. He remembered tying an epulis for a patient at the Dental Hospital; at the next visit, the growth showing no signs of separating, he transfixed the pedicle and tied each half. As the result of this one half sloughed and the other half was not affected, and finally the growth had to be removed with the knife. The pedicle was very dense and contained spicula of bone.

Mr. A. Underwood remarked that it was difficult to be quite sure of the nature of these growths; some very simple and non-recurrent, whilst others were decidedly of a malignant character. The naked-eye appearances, especially, were very deceptive. Under these circumstances he thought it was best to operate in such a way as to reduce the chances of recurrence as much as possible, especially in persons at all advanced in life.

Mr. Boyd Wallis referred to two cases of epulis treated by electrolysis which he had brought before the Society about two years ago, models of which would be found in the Museum. No recurrence had taken place.

Mr. Walter Coffin said he had met with one case of epulis which had been successfully treated by electrolysis. He had heard it stated—he did not know whether it was true—that treatment by electrolysis, even if not successful in removing the tumour, did not aggravate it, as incomplete surgical operations not unfrequently did, and this, if true, was certainly an advantage.

Mr. Maggs, in reply, said that doubts had been expressed as to whether the cases he had described were cases of epulis. The term was not capable of very strict definition, but he was equally in doubt as to whether the cases mentioned by Messrs. Walker and Betts were cases of epulis; he should have said they were rather of the nature of vascular growths. He wished to point out that in each of the cases he had reported he had removed the teeth which appeared to have given rise to the growths. This would be followed in due course by the absorption of the alveoli, and therefore it appeared to him unnecessary to interfere surgically with parts which would if left alone be removed by a natural process, and he still thought that, at all events where the growth sprang from a limited base, the treatment he had adopted was sufficient.

The President then thanked those who had brought forward communications during the evening, remarking on the instructive character of the cases and on the amount of discussion they had elicited.

He thought it might be interesting to the members to hear that as President of the Society he had received an invitation to be present at the laying of the foundation stone by the Queen of the new Examination Hall of the Royal Colleges of Physicians and Surgeons on the Embankment.

The Society then adjourned.

IRREGULARITIES IN HUMAN TEETH; OR DENTAL TERATOLOGY.*

By John J. R. Patrick, D.D.S., of Belleville, Ill.

(*Concluded from page 404.*)

The deciduous teeth, on account of their soft and porous nature, are readily permeated by injurious fluids, and are, therefore, subject to early destruction ; and since these teeth have much larger pulp-cavities in proportion to their size than the teeth of the permanent set, and these cavities enclosed by soft, bony walls, which are easily destroyed, it can readily be seen why the deciduous, especially the molars, are often, in the first year of their appearance, so easily attacked by caries and destroyed. The porous and moist nature of these teeth renders them subject to a wet caries, and not having far to penetrate it soon exposes the pulp-cavity. When the pulp of a deciduous tooth is exposed it may be destroyed, but it cannot successfully be removed and filled, as in the case of a permanent tooth ; for if this is done the filling will prevent the constant flow of ichorous fluid which is always present in such teeth, and instead of escaping by way of the carious opening it will force its way through and permeate the spongy bone of the alveolus, and may destroy the cell-walls of several deciduous teeth.

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*A paper read before the Illinois State Dental Society, and published in the *Transactions*.

Furthermore, when we consider that the dental root septa of the deciduous molars are immediately situated between the fangs, forming a pad of spongy bone between the cusps of the half-formed bicuspids and the bifurcation of the fangs of the molars, and that the pulp-cavity is very thin at the bifurcation of these fangs, and is the first point to be absorbed, it will be seen that when the spongy septa, that separate the deciduous from the permanent teeth, become infiltrated with ichorous fluid, the cusps of the permanent teeth may not only be discoloured, but partially or wholly destroyed ; these pathological conditions occur more frequently in the lower than in the upper maxillary, owing to the attraction of gravitation.

Now, the maxillaries of children are full of cavities and soft walls in which purulent matter finds easy ingress, whereby subsequent destruction is more likely to take place than in the same bones of the adult. The neglect to extract such teeth, either by ill-timed parental affection, or a misconception of the anatomical and pathological condition of the parts, is the cauee of some persons never having all their permanent teeth during their lives in the region of the deciduous teeth, and why others have teeth with defective enamel. All the other deciduous teeth of the superior and inferior maxillaries have undivided primary cells, and are therefore less liable to destruction than the molars, which have dental root septa dividing the primary cells. If, however, the several deciduous teeth can be retained until the periods of the eruption of their several successors, without detriment to the child's health, many tendencies to irregularities may be prevented ; for if a sound deciduous tooth is extracted several years before the time of its successor's appearance, which unfortunately is sometimes done to relieve the crowded condition of the already erupted permanent incisors, then the cells of the extracted deciduous tooth will fill up with osseous matter, and since the succeeding tooth cannot penetrate through such a bony cicatrix it will find its way through the external or internal wall of the alveoli, and appear outside or inside the dental arch, if it appear at all. Sometime such retarded teeth do not appear until extreme old age, when the alveoli have absorbed and exposed them to view. Again if sound deciduous teeth are permitted to remain beyond the period of their natural dissolution the same deplorable condition of the second set will be realised, for the theory of the roots of deciduous teeth serving as guides for their successors is not well founded, for the following reasons: A perfect deciduous tooth can only be obtained from a healthy child between the age of four and five years, one year earlier the root ends are not completely developed, and one year later the ends begin to be exuviated.* When the first set of teeth is forming, the cells, cell septa, and dental septa are formed with them; in a word, they bring up their own process, and when the evolution of the tooth is completed a physiological process of exuviation sets in, which gradually sweeps away the process with the teeth, whence come larger teeth, accompanied by a larger process, and the jaws are correspondingly larger. When we consider the manner in which a tooth is evolved, the belief in the "resorbed ossific tissue of a deciduous tooth performing an important part in elaborating the second dentition must be considerably weakened." It has been long established that the development of dentine is by *centripetal calcification*. A tooth, when fully formed, is subject to decay, but has no inherent power of reparation. A tooth of limited growth* can only increase in size, after its formation is completed, by abnormal growth of its most highly organized constituent, the *cementum*. And, further, no effete material can be resorbed without producing deleterious effects on the system. This pleasing thought, that the deciduous teeth are worked over by the hand of niggard nature in the spirit of affectionate frugality, for the benefit of the permanent set, finds its parallel in the belief that the bear grows fat in the hibernating season by the simple operation of sucking his paws.† Such notions only serve to illustrate the theories advanced from time to time in mechanics, and the many phenomena presented in the cycle of life, that something can come from nothing. That which concerns us the most as guides in practice is the fact in every given case, not whether the facts are pretty; for so long as suffering humanity look to us to relieve them of maladies, sentimentality or belief will be but a poor substitute for a knowledge of laws that govern the universe.

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*In this connection I prefer the word "exuviated" to that of absorbed, as more expressive of the physiological conditions under consideration. Absorption may be either external or internal; may be either absorption of decomposition, or absorption of composition, whereas the word "exuviation" needs no paraphase, but expresses in one word the physiological process by which animals cast off, at certain periods of their growth, the tissues that have served a purpose, preliminary to renewal. Thus animals shed their hair, birds their feathers, deer their horns, lobsters, crabs, and crustaceans in general their shells, and all mammals their first set of teeth, by a physiological process of exuvation in contradistinction to the pathological process of exfoliation.

*In the incisor teeth of rodents, in which the formative pulp is persistent, the teeth are unlimited in their growth, and the pulps are always found in full progressive activity up to the time of the rodent's death, and these teeth are not preceeded by deciduous teeth.

In the regulation of irregular teeth there are many factors to be considered; for, inasmuch as a living tooth cannot be moved without moving something else, an intimate knowledge, not only of the forms of the teeth but their surroundings, both in the living body and the skeleton, is absolutely necessary. For in shifting a tooth the relation of the parts becomes changed, and success will depend upon the activity of the tissues to heal and repair injury; and this will depend upon the special vigour of the patient and the extent of the surface injured, as much as upon the means employed. Now, since an accurate knowledge of the osseous formations which embrace the roots of the teeth is of great importance to the operator, I will describe them as they appear in the sections I have made for that purpose, and from the best authorities I can find, giving the substance of their description or classification rather than their words.* For every tooth implanted

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† The truth is the bear grows thinner every day he stays in his hibernating condition.

* Odontography; or, a Treatise on the comparative Anatomy of the Teeth; Their Physiological Relations, Mode of Development and Microscopic Structure in the Verbate Animals, by Richard Owen, F.R.S. In two volumns, one of Text, and one of Plates. London, 1845.

Since the first publication of this work there has been no work written on any of the branches embraced under the head of anatomy in the superior or inferior maxillary there is to be found a more or less funnel-shaped cavity, which is surrounded by thin and compact bony walls; this cavity is the tooth cell. Each of these cells begins on the extreme margin of the alveolar process, circular in form, adapted to the form of the tooth, a little below the termination of the enamel; this is the *primary* entrance, gradually it becomes smaller, and ends by an almost closed point, in a more or less vertical direction. If such a cell is divided into several portions, as in the molars, there will be a ring-shaped primary entrance from one to one and a half lines deep; within this entrance there begin secondary entrances, which extend and terminate in isolated funnel-shaped cells; each cell is for the reception of a tooth, whether it has one or more roots, and therefore they are named primary cells. These cells are either divided into several sections, or they are undivided; the first are called divided cells; the second, undivided cells. To the former belong the cells that receive the molars of the superior and inferior maxillaries, and to the latter belong the residue, which are single and receive the roots of these teeth that generally have but one root. Now, as a general rule, the divided cells of the superior maxillary are formed into three, by a wall projected from the posterior to the anterior, and another projected from the external internally to the posterior anterior projected wall. Whereas each divided cell

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that is of any importance, in any language, that either directly or indirectly treats of the teeth, but that has been compelled to refer to Richard Owen—and why this work has not been included in the list of text books to be used in dental colleges is a question for those who are *deeply interested in dental education to decide.* From the time of John Hunter to the present there has been no work on the anatomy of the human mouth and teeth superior to the work of Dr. George Carabelli. He is not mentioned in any English work on the teeth, excepting in the work of Carl Wedl, M.D., in his Dental Pathology. Kolliker in his Manual of Microscopical Anatomy, at the close of the chapter on the teeth, in giving the literature of the subject, makes no mention of Carabelli. I take this opportunity to present his name to the profession as one of the great original workers in the science of anatomy, and particularly in that branch of anatomy that relates to our specialty. Dr. George Carabelli was a surgeon in the Austrian army, and flourished during the early part of the present century His work on the "Anatomy of the Human Mouth" was published at Vienna in 1844, in two volumes, one of Text and one of Plates. They have both been freely used in subsequent works.

of the inferior maxillary is divided by one wall running from the external to the internal, dividing it into two cells. These cells receive the roots of the molars that are implanted in them, and since they are the final ends of the primary cells they are named *filial cells.*

All exceptionally formed cells, as for example, a cell for a fourth or fifth root of an upper molar, for a third or fourth of an inferior molar, or for a double root of a bicuspid, are named *fortuitous filial cells.* The interspaces between the tooth cells are filled with cancellated bone which holds them together, and in which, as it were, the cells are implanted. The interstices of this cancellated bone give protection to the nutrient vessels that supply the teeth, process and soft tissues by which they are surrounded. By this spongy bone each primary cell, immediately at its entrance, is bound from the anterior to the posterior part of its adjacent cell. Thus two cell-walls come into coalescence and form a more or less double wall, which is always found to separate two cells from each other, therefore they are called *dental septa.* This septum projects one-half, and sometimes one whole line above the external and internal cell margin, fills the space between two teeth, and serves to keep the teeth equally apart and firm in their places.

All dental septa are at the base thicker than at the free projecting margin. The free margin of the dental septa adjusts itself, partly to the diameter of the adjacent tooth roots and partly to the distance between them. Thus the septa between the four dental cells of the superior incisor teeth, in relation to the width of the tooth crowns, are not so thick as those of the corresponding cells of the inferior, for the reason that the roots in the superior are very thick, and, therefore, so close together that only a thin wall can find place ; while in the lower incisors the roots are depressed laterally, and their widest diameter, being crossed by their crowns, leaves a greater space which is filled by a thicker septum ; and, finally, the cell-walls which separate the filial cells are also spongy, not double, and much lower than the dental cells, and since they only separate the filial cells of the roots of the same tooth they are called *dental root septa.* Now, in teeth that are unusually distant from each other, or in teeth in which the cervical portion is small in comparison to the crown, the *dental septa* will be proportionately stronger and thicker, and will increase the difficulty of moving a tooth laterally, in the case of the front teeth, or anteriorly or posteriorly in the case of the back teeth ; and this applies equally to the superior and inferior maxillaries. Teeth that are on the outside of the arch of the superior set require more continued force to move them inwards than the same teeth, if they were inside, would require to move them to the outside of the arch ; for the outside of the arch of the superior maxillary process is the weaker, whereas the inside is reinforced by the palate process, which gives it a greater power of resistance. The conditions are different in the inferior maxillary, as I have already explained. As neither the crowns nor the fangs of teeth have a regular shape in their circumference, and the anterior six are biconical in their greatest length, it is easily seen how small an obstacle will turn them from their regular course, and as the form is more favourable for such a divergence in the front teeth than in the back we accordingly find irregularities more frequent in this region.

Now, as there are no two cases of irregularities exactly alike, and as the circumstances surrounding each case are not the same, it would be impossible to lay down rules to govern their treatment. The cases which are constantly presented for treatment are as complex in their character, and as difficult to reduce to rule, as the judgment and mechanical qualifications of the operator who may undertake their correction. There are, however, a few facts connected with the regulating of teeth that appear to be self evident : *First*—If a tooth can be diverted from its natural course and given an oblique direction by the mechanical forces in nature, during its development, the same forces, used with intelligence, can restore it to its natural position. *Second*—As it required time in the course of nature to produce the displacement, so it will require time in the course of nature to induce a replacement, since the operation cannot be removed from the natural laws which control it. *Third*—As the ossification of the incisors and canines is not completed until the tenth and eleventh years, for obvious reasons it would be well enough to postpone all interference until the fourteenth or fifteenth year. If the canines and incisors are examined during the first few months of their appearance, three small cusps may be seen on the incisors, and sometimes on the canines; later these soft cusps are worn, and in one year they have nearly disappeared. While these cusps remain, the fangs of these teeth are not completed. It will also be observed that the deciduous teeth do not carry these cusps, for the roots of the deciduous teeth are hardly formed when elimination commences. *Fourth*—All devices or machines used for shifting teeth must be simple in their character, for the less complicated the machine is the easier it will be to understand and use. *Fifth*—The machine should be so constructed as to act on at least three points; two fixed points on the teeth that are not to be moved, and one on the tooth that is to be moved. *Sixth*—As the requirements are at least two fixed points, and one movable, if the first two cannot be obtained the machine is useless. On the other hand, if the tooth to be moved is not sufficiently developed to permit the movable point to act upon it, it is also useless. *Seventh*—As the stability of a tooth is not in proportion to its size or external appearance, two fixed points at least are necessary to insure success. *Eighth*—The real necessity of extracting teeth to correct irregularities is very rare, and, therefore the safest rule will be to observe an armed neutrality, and make the case a special study. If this rule is observed long enough the truth will finally appear, and will well repay the observer.

The mixture of races is a prolific cause of irregularity of the teeth, not only in relation to the jaws, but in relation to the individual parts of the teeth themselves. Teeth of fine proportions cannot be considered apart from the size of the bones of the face and, in fact, of the whole body. They may be symmetrical in themselves, but unsymmetrical in regard to their relationship, for a fine set of teeth, in the mouth of a

Caliban would only serve to intensify his repulsiveness. Now, the size of the teeth in human beings varies, and has no proportionate relation, in many cases, to the size of the body; thus, very frequently, small persons have very large teeth, while, on the contrary, persons of colossal size may have narrow and small teeth. Large persons have large jaws, but the teeth do not correspond to the size of the jaws as often as the jaws correspond to the size of the body, either in large or small persons. There are large jaws with small teeth, and small jaws with large teeth; the latter occur more frequently in small persons, while the former are of rarer occurrence in large persons. This irregularity of form and development of the teeth and jaws in relation to the body does not exist in any other class of mammals, and occurs more frequently in the European and mixed races, than with the unmixed.

I have used the expression "races of men." When the word race is spoken of the European mind immediately sees the Negro, the Chinese, the Red Indian, and the Hottentot. He admits that there are people who differ from him, but not in Europe; whereas, the European race, so called, differ from each other as widely as the Negro from the Bushman, the Red Indian from the Esquimau, the Esquimau from the Peruvian, the Peruvian from the Patagonian. Asia is full of different races of men, from the cold north to the extreme south. Africa, from the cold south to the tropical north. South and North America were full of races of men long before the European knew they were in existence. *Genus homo*! Man forms but one genus, and while that genus is the only one of its order it is divided into many species. Genus is an assemblage of species, and the many species which go to make up this *genus homo* are of endless shades of colour; commencing with jet-black and finishing with white, and in the whitest species the greatest mixture appears to prevail. The colored species are largely in excess, and form at least seventy-five per cent. of the whole genus. But this percentage of the dark over the white is rapidly being reduced, owing to the superior intelligence of the white. Now, the reason why naturalists assert that man forms but one genus, which is composed of many species, is that there is no physiological barrier which prevents him from crossing and recrossing without end, propagating from the very lowest of his species to the very highest; hence, it is conclusive that the whole species are homogeneous. Now, this is not the case with other classes of mammals, for while many others possess characteristics in common, physiological barriers prevent them from crossing; hence it is that naturalists divide them into species, and sub-species, families and sub-families. Take the eighth order of mammalians (ruminantia), while all the individuals which compose it are constructed on the same plan, especially as regards the teeth, they are divided into many genera—sheep, goats, antelopes, stags, camels, llamas and oxen—which cannot intermix; the antelopes alone compose a very numerous genus, consisting of over seventy well defined species, which do not even cross with each other; and it is the same with the cats, a numerous genus of the third order (carnaria), tiger, lion, leopard, lynx, puma and panther; each species retains its individuality, and is incapable of crossing, hence their teeth and jaws are regular as to form and size, in relation to the body; therefore, there are good reasons for the irregularity of the teeth in human beings, to be found in the crossing and recrossing of the many species of which they are composed.

THE EARTHY PHOSPHATES.*

By W. C. BARRETT.

The administration of the earthy phosphates to pregnant women and to young children has been a favorite prophylactic method of treatment with many intelligent dentists. The theory upon which this system was founded is that decayed or defective teeth owe their condition to trophic disturbances, and that it is but necessary to supply the missing elements in order to produce perfect dentures.

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* A paper read before the American Dental Association and reported in the *Transactions*.

The theory is a very plausible one, and it gave credulous practitioners excellent opportunity to enlarge upon the wonderful process of gestation, and the marvelously interesting double function of the expectant mother, whose digestive apparatus must furnish not only pabulum to sustain her own physical being during a trying period, but substance to the fetal man or woman which she carried beneath her heart. If her own teeth decayed during the period because of the neglect that at such times is common, she was perhaps treated to long dissertations upon the imperative demands of the growing fruit of her uterus, which not finding the needed elements in the blood with which she supplied it, was robbing her own osseous system to supply its wants. If her teeth were found to be soft, it was because their character had changed, and the lime-salts of their crystalline structure had been taken out to build up the young child. Corroborative evidence, when looked for with biased judgment, was not lacking, and dentists had many tales to relate of the most stupendous changes effected in the dental development of children through a judicious administration of the lacto-phosphate of lime to the mothers during pregnancy. The instances in which such results seemed apparent were cited, while those in which no effect resulted were not included in the category, or were attributed to a want of faithfulness in taking the prescription. We believe that which we desire to believe, and there is no difficulty in finding apparent confirmatory evidence to sustain the most absurd of postulates when one sets out with a determination to do so.

There is probably no one who has followed the prescribing of the earthy phosphates for a supposed dystrophic condition who will not, if his memory be refreshed and his data perfect, call to recollection very many failures. If he shall have traced the after-history of children born of mothers who during pregnancy were subjected to the phosphatic treatment, he will probably find quite as many with defective teeth as in those who were born under other conditions. Earlier in my own professional history I experimented with the different preparations in numerous cases. One of the first of these was that of a lady pregnant with her second child, the first being in a deplorable dental state. The seeming results were amazing. Not only was her gestation more pleasant and easy than the former one, but the dentition of her infant was almost entirely without the usual febrile disturbances, and the child's teeth, up to the time when I lost sight of him through the removal of the parents, presented a remarkable contrast to those of his elder brother. This case would possibly have confirmed me in the use of the phosphates were it not that about the same time I had contrary experiences. In one notable case, that of a lady pregnant with her fifth child, I persuaded her to a thorough course of my then favorite remedy. All the other children had excellent teeth, their dentition being much above the average. There was no special reason why she should be subjected to prophylactic treatment, except that I fancied I saw disastrous effects impending to her own teeth, from what I presumed to be an abnormally soft condition, and because I was at that time pushing this investigation with strong hopes that I had hit upon a means by which a perfect dentition might be assured to every child. As time rolled on I beheld the direct antithesis of the first-cited case. The child had all manner of difficulty in getting its teeth, and when they were in place I saw, to my confusion, the only really bad denture in the family.

Of all the women whom I subjected to this treatment, there was not one in which the experience of the lady of the first instance was repeated. That case was, no doubt, an accidental one, and the results were due to something besides the lime treatment. Experience alone led me to entirely abandon the practice, and when subsequently I made a more thorough study of the physiology of nutrition, I became confirmed in my scepticism concerning the utility of the feeding of phosphates to pregnant women, or even the indiscriminate recommendation of such foods as are particularly rich in earthy materials. The facts are against it.

A few years since it was common to hear denunciation of the use of fine flour, from which it was declared that the miller had eliminated all that was of use in the building up of the bony system. Elaborate papers have been read before this Association in which it was demonstrated to the satisfaction of the really thoughtful and honest essayist that the decay of teeth, which was supposed to be a modern disease, was due to the lack of phosphates in the fine flour that formed the chief article of subsistence. Since then computations have been made of the amount of bone-making material that is found in the finest of wheat flour, and of the amount that is needed by both mother and fetus during gestation, and it has been demonstrated that, should she live entirely upon this article of diet, there would still be an excess of the lime-salts. It is a fact that during pregnancy there is almost universally a continual elimination of these principles, which are easily traced in the excretions. Any pregnant woman who lives upon almost any diet that is sufficient to sustain life will, if the nutritive organs be in proper condition, find more than is necessary of these elements to keep the system in proper condition. It should be remembered that the nutritive changes in the bones and teeth are less than in the other tissues of the body, because they are more permanent in essential structure and character. Especially is this the case with the teeth, in which trophic changes are very limited indeed. That such a distrophy may exist as shall materially affect these organs, no one will probably deny ; but the process will of necessity be but a slow one, and the changes will not soon be manifest.

And now let me detail some of the physiological reasons why the giving of the earthy phosphates for nutritive purposes must be a mistaken treatment, and why, to my conception, it is based upon erroneous assimilative views.

All pabulum must originally be derived from the earth. That is the primal source of all nutritive material. But there is no order or class in the animal kingdom that can elaborate it. There is no animal organism that can derive nourishment directly from earthy matter. That function rests solely in the vegetable kingdom. Animals are not primal organizers. They cannot digest the inorganic. They require organized structures for their food. The study of vegetable physiology shows that these alone have the ability to assimilate inorganic matter, and out of earthy material to organize tissue that shall serve as food for the higher orders. When matter has once been organized into vegetable products it may serve for the sustenance of animals.

Some of the animal kingdom subsist upon matter that is but one remove from the inorganic. To this class belong the Graminivora. Other animals require that their food shall have been twice organized; first from the earth into vegetable form, and again by an animal into a higher form. To this class belong the Carnivora, which cannot digest or assimilate vegetable organisms until they shall have been reorganized into an animal.* Others are Omnivorous, and their digestive apparatus will prepare nutritive matter that has been but once organized into vegetable life, or that has been again organized into animal existence. To this class belongs man. But neither he nor the Graminivora can make nutritive use of inorganic matter any more than can the Carnivora. It follows, then, that if inorganic matter be introduced into an animal organism it is entirely foreign, and must be eliminated in an unchanged condition. If it remains within the system, it is essentially and must ever be a foreign substance, an irritant, that, if not promptly rejected, will create internal disturbances of a more or less serious nature. All inorganic matter, then, is foreign to the animal system, and, so far as nutrition goes, it is not only entirely useless, but absolutely mischievous.

It is true that certain toothless classes, which are provided with a proventriculus, swallow inorganic crystalline bodies, but these answer only a mechanical purpose, in assisting to triturate the food, thus adventitiously serving in place of dental organs. The small stones in the gizzard of the fowl are foreign bodies, which play no part in assimilation.

Some of the proximate principles of animal bodies are made up mainly of inorganic material, but they never exist as simple substances, unless in the case of the iron of the blood, if that be a proximate principle. That exists only in a kind of solution, held there by the other constituents, and it is not assimilated directly. The calcium of the bones and teeth exists in combination with other substances, and it is never assimilated directly, but it is elaborated and the combination formed within the system. The carbonate of lime and the phosphate of magnesium are not taken up as such, but the carbon, the phosphorus, the calcium, and the oxygen are elaborated within the organism, and their chemical union is there completed when they are built into the tissues. The building of this animal house of ours cannot be brought about by feeding bricks and mortar. The raw material must be furnished in other compounds, which it is the province of the nutritive apparatus to disorganize, to separate into their constituent elements, and to re-combine into tissues. Every particle of tissue principle must be elaborated within the body, and built up, not from compounds, but from simple elements. If carbonate of lime be needed for the teeth, it is of no use to feed oyster-shells. The system will not take carbonate of lime, but it will elaborate the material from the calcium, carbon, and oxygen that it derives from food, and it will take its carbonate of lime in no other way. It is the same with the phosphates, and hence the inutility of giving any preparation of that material which cannot serve as pabulum. So complete and perfect is the nutritive process in the healthy organism, and so universally and admirably are the elements provided in all organic matter, that a perfect digestion will find in any material that is fit for food sufficient of the different ingredients to elaborate into pabulum for all the tissues. Were not this the case, it would be impossible for the different races to exist under all the varying conditions in which they must live. The dweller in the hyperborean regions of the far North, where vegetable life scarcely exists, must make a subsistence almost exclusively out of an animal diet. But his whole system is as well nourished as is that of the omnivorous dweller in the temperate regions. There are those who live upon an exclusively vegetable diet, and none of the tissues are starved. People have subsisted wholly upon fruits. Yet every organ was perfect, because of this universal diffusion of the elements of nutrition. The simple substances of which the body is composed are comparatively few, and are found everywhere. Were it otherwise—were it the case that the organism is unable to elaborate its compounds from the elementary substances ; were it the fact that carbonate of lime and fluoride of calcium and all the compounds must be supplied as they exist—it can readily be seen that animals could not subsist upon a simple diet. It would be necessary to supply such foods as contain the exact compounds needed, and this, except under the most favourable conditions, would be impossible. Hence but a very small proportion of the earth's surface would be habitable, and most orders of animals would become extinct through inability to obtain the exact compound needed for so complex a nutrition. The laws governing our existence are simple, if we would but study them intelligently. Animal life can subsist upon almost any kind of organic matter not absolutely poisonous, and yet be well nourished.

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* It is a rather singular fact that most of the animals that require their food twice organized are unfit for food themselves. Their flesh is rank, unpalatable, and innutritious. There are exceptions among fishes and birds, but of the mammalia the flesh-eaters are themselves uneatable.

Inorganic matter does, however, play an important part in the human economy, but man is the only animal that makes any extended use of it. Many inorganics act as special irritants or excitants to definite organs. Their very presence in the system may induce certain structural or functional changes, and thus, in abnormal conditions, they may play an important part. When they are administered for any such purpose we call them remedies, and man is the only animal that employs them. Our medical pharmacopœia is largely made up of inorganic matter, to be given for the purpose of inducing certain changes corrective of others brought about by dystrophic condition. If intestinal function ceases through the presence of innutritious or indigestible matter, an inorganic remedy may by its mere presence induce such violent peristaltic action as to eliminate the obstructive matter. Alterative effects follow the ingestion of some inorganic substances, but it should always be remembered that such matter is foreign to the organism, and is always extruded at the earliest opportunity. It takes no part in nutrition, and is never built up into the tissues. I believe it to be a general rule in physiology that inorganic matter introduced from without is always foreign to the system, and it is always eliminated as soon as possible.

It must follow, then, that the giving of the inorganic earthy phosphates for nutritive purposes is always a mistake. If they act at all it must be remedially, and if they are to be so used they should be intelligently prescribed, like any other agent, and only for their medicinal properties. I have no knowledge that they have any very decided medicinal virtues, and therefore I can see no excuse for dispensing such inert compounds.

MESMERISM AND DENTISTRY.—A Liverpool correspondent referring to a private *séance*, an account of which will appear in our "Selections," writes :—"The private *séance* was got up with a view of testing the possibility of producing complete insensibility to pain during extractions, etc., whilst being under mesmeric influence, and we must own that the result was a complete success—the patient was unconscious during the operation."

THE NEW DICTIONARY OF SURGERY.—A companion volume to Quain's Dictionary of Medicine is being issued by Messrs. Smith, Elder & Co. The fact that Mr. Christopher Heath has found time to undertake the editorship cannot fail to make the new dictionary popular. Few surgeons have achieved so deservedly the entire confidence and esteem of dental surgeons than has Mr. Heath, his classical work upon the jaws and his wide experience and successful practice in oral surgery has brought him constantly into contact with dental surgeons and dental surgery. And with men like Christopher Heath, seeing is believing.

British Journal of Dental Science.

LONDON, MAY 15, 1886.

THE MEDICAL AND DENTAL CHARITIES OF LONDON.

The present time is one when most of the medical and dental charities of London are putting forth, in one way or another, appeals for assistance. Annual General Meetings are to be counted by the score, dances, bazaars, fancy dress balls, are all more or less represented in the long list of means active secretaries employ to facilitate the balancing of Hospital Ledgers. The dental charities of London are, of course, of more especial interest to us, so we see with pleasure that that most useful institution, the National Dental Hospital proposes to hold a dinner in support of its funds. Few of the general public appreciate the fact which the National Dental Hospital committee have pointed out, that dental hospitals have an especial claim upon their support, one indeed, which must be admitted, is almost their's alone. This claim arises from the fact that the dental hospitals alone afford tuition and practice for dental students. What a horrible nightmare is the thought that were no dental hospital existent our dentists would be men who, however well versed in theory, would be wholly lacking practical, manipulative skill. The general hospitals have not the appliances nor the leisure for systematic instruction in dentistry, so that, as a rule, they do not go beyond affording the dental surgeons who may be upon their staffs, opportunities of teaching what teeth should be saved, and what teeth should be pulled out, and how such teeth should be pulled out. Now, although very important rudiments, such instructions do not, nowadays, go very far towards converting the crude schoolboy into the skilled dentist. Now, what the general hospitals fail to do, the dental hospitals accomplish: they supply a skilled teaching staff, and abundant material upon which the students can work. Unhappily, the general public, with the exception of just a few persons brought into immediate relation with the dental schools, do not appreciate the full merits and great social advantages existing in institutions like the dental hospitals. The dinner which the National Dental Hospital will hold on behalf of its funds is the first dinner as yet held in London in aid of a dental hospital, and so it will we trust, not only prove a great pecuniary gain for the institution in question, but will extend the knowledge of how our dental hospitals do their work, and how useful they are. The appreciation in which the National Dental Hospital is held by the class from which its patients are recruited will readily be seen by the figures we print elsewhere in our columns which show that a steady increase takes place year after year in the number of persons who apply for relief. For those who may not know the great high esteem which the medical and dental world have of the National Dental Hospital, we may mention that among the list of stewards we observe many names which must carry the utmost weight. It would be invidious to select any, when all are so good, but we may perhaps pick, haphazard, Christopher Heath among the surgeons, Dr. Broadbent among the physicians, and Sir Edwin Saunders among the dentists as giving earnest of the very high tone and character of those connected with the dinner.

THE LATE MR. JOHN JAMIESON.—It is with much regret that we note the death of one so well known and so justly esteemed by dentists as was Mr. Jamieson. In our obituary column we propose to offer our readers a brief sketch of his eventful and useful life.

Abstracts of British & Foreign Journals.

ITEMS OF INTEREST.

Norman W. Kingsley, New York.

The "Eminent Surgeon's" malpractice calls attention to the bad practice of attacking antral disease by making incisions in the cheek, thereby leaving a lifelong unsightly scar.

He then asks: Which should be sued? The Dentist or the Surgeon? A specialist inextracting under nitrous oxide was accused of smashing anupper jaw while removing two upper molars and an operation had to be subsequently performed by a surgeon to remove the broken bone. The defendant sought advice denying any breaking of the jaw. He was advised to apply to the Court for a commission of experts to examine the patient. Dr. Norman Kingsley and his colleagues found the patient with a scar from one to two inches in length in the cheek partly forward and below the cheek bone. [The Surgeon's work.] The patient declined to answer any questions. A critical examination showed to their entire satisfaction that the jaw bone could not have been broken, nor any unusual removal of alveoli have taken place, as the present condition was the usual and natural one in the absence of teeth. And in any event that any bone which by any possibility could have been fractured in the extraction of upper molar teeth, and, which might require removal, could better be taken out through the mouth than through the cheek.

Staphylorraphy unreliable, the third "item of interest," is a surgical case of a different character, performed by a surgeon, and shown before the Odontological Society of New York.

It was a congenital cleft palate which had been sewed up for a young lady about twenty years of age.

The surgical success was complete ; that is, there was a good union, and, to the non-expert, the palate was entire and normal.

We were not permitted to hear the young lady speak. She declined to read, saying in a low tone, "not to night." The peculiar defective articulation of the average cleft-palate patient was in those two words, unchanged by the operation, and the articulation would always be imperfect.

Dr. Kingsley has demonstrated before various societies in America and in Europe that it is impossible to produce perfectly distinct and natural articulation by a surgical operation on a cleft-palate. Not only does the philosophy of articulation show this, but also the statistics of staphylorraphy.

Furthermore, the operation, instead of benefitting the patient, is a positive damage, placing him beyond the power of remedial means from other sources.

WHAT IS A TOOTH?

C. N. Pierce, D.D.S., Philadelphia.

All teeth may be arranged into five classes. (1). The simple cone-shaped tooth, the cuspid of the carnivora, the prehensile teeth of all animals swallowing their prey whole, and a large class of fishes, as well as the poison-fang of reptiles and the teeth of the sperm-whale. These are among the simplest forms of teeth. (2). A chisel-shaped tooth, the incisors of the rodents and other vertebrates. (3). The trenchant-shaped teeth seen in carnivorous animals, which shut over each other like the blades of a pair of scissors, and are for lacerating or tearing. (4). The teeth of the monkey tribe, with little tubercles on the triturating surface for crushing. (5). The molars, as of the elephant and of the rodents, but the most specialized or typical are those found in the herbivora, used for grinding grass and dry food.

A mandible that is armed with cone-shaped teeth shows its movements to have been limited to a vertical or up-and-down motion. The teeth in it are not for trituration, but for seizing. The shape of the condyle and the glenoid cavity corresponds with this cone-shaped tooth and the vertical motion which is found in all carnivorous animals. Hence the food habit controls, not only the movements of the jaw and shape of the teeth, but the form and adaptation of the condyle and glenoid cavity.

In rodents and elephants, instead of the glenoid cavity a convex surface and the condyle a flat or slightly concave surface appears, which slides over the convex surface of the glenoid cavity ; and this arrangement permits not only a lateral motion of the jaw, but the antero-posterior which is so essential to the rodent. The food habit of the animal was the first factor producing the lateral and antero-posterior motions, and these motions gave the tooth-form, the condylar articulation necessarily following.

The teeth of the mammalia, and nearly all vertebrata, are made of three tissues—dentine, cement and enamel, the enamel-germs being present in all. In a large class of animals, as in man, these tissues are arranged with the dentine in the centre the enamel covering the dentine of the crown, and the cement covering the dentine of the root. This obtains also in the teeth of all carnivorous and omnivorous animals ; and in these animals we find the teeth less specialized than in the herbivora and rodentia. In the latter, instead of having the enamel covering the crown, it is in transverse lines running across the triturating surface, or the peculiar W-shaped pattern, by a dipping in of the enamel from the sides, as is seen in many of the herbivora. Where there is an antero-posterior motion of the jaw in connection with the lateral, these lines run transversely across the teeth, and with this the most complex structural conditions. This arrangement allows the three tissues of such different degrees of density to make the most dense tissue prominent, which is most efficient in the preparation of the dry food on which the animals subsists.

THE DENTAL LABORATORY.—ADVICE TO BEGINNERS.

Dr. L. P. Haskell, Chicago.

The laboratory should be large, well lighted, easy of access from the operating-room, and shut off from that and the reception-room by close partitions.

The fixtures should be conveniently arranged, the work-bench in front of the window.

The lathe should be stationary on the bench, if possible, and in a good light.

The tools should be arranged in a rack at the back of the bench—a place for each, and each in its place. Have every tool needed for the successful work, but do not have duplicates in the rack ; lay them one side till needed.

The laboratory should not be used as a machine shop nor a carpenter shop.

The plaster-bench should be so arranged that the waste will drop into a box or barrel through a hole in the bench.

When metal work is being done, preserve the plaster casts, especially of partial sets, as plates are sometimes bent, and if you have the cast where you can readily find it you can soon restore the plate to shape. If the patient is going away out of reach, it is as well to give it to him, to give a dentist elsewhere when needed.

The importance of cleanliness is insisted upon.

The really necessary appliances of the laboratory for doing metal work are as follows:—

Plate shears; nippers; punch; benders (lower, equally serviceable on upper plates); flat, and round-nosed, pliers; riveting hammer; horn or wood mallet; countersink for reaming holes in the backings; blow-pipe, large, if one can be found, as it can be used easier and more satisfactorily; half-round, and round, fine plate files; flat-plate burnisher; tweezers for solder; swaging-block, that can be run under the bench alongside of gold-drawer; swaging hammer; tin pan, with strainer for gold; two ladles for melting metals; moulding ring five inches in diameter, three inches deep; casting ring for counter die; moulding sand, not too fine; sieve; pulverized borax and slate or piece of glass to wet it on; piece of pumice stone, or the lava slabs to solder on; for large work, a sheet-iron cup, half-circle, open on the straight side, with handle ten inches long riveted to the bottom; acid dish easily made of sheet lead, three inches in diameter, one and one-half inches deep, with handle formed out of the lead; sulphuric acid; small-sized brush-wheels, soft, do better and quicker work than the stiff ones; pumice and whiting; pine stick adjusted to the lathe prepares the surface for the brush better than anything else.

EXTRACTING TO PREVENT CROWDING.

Dr. Henry S. Chase, St. Louis.

Nineteen persons out of twenty have crowded teeth at the age of twelve, thirteen, or fourteen. Such a condition is a fruitful source of decay. Contact even is bad, but pressure is fatal.

To cure this he recommends—Extract four teeth at about the thirteenth year. If all the teeth are sound, select the bicuspids, or the first molars. Choose between sound and decayed or imperfect teeth, and select the latter. Make a space then of the width of one tooth at about the location of the second bicuspids, in each jaw. The space will be filled in two or three years by all the teeth moving towards it.

DENTAL COSMOS.

NITRO-ORGANISMS OR FERMENTATION?

Dr. W. H. DWINELLE in N.Y. Odontological Society.

The writer prefers to adhere to the acid theory of caries. He urges, the theory of bacteria does not supplant the acid theory. He has observed that some patients lose more of their teeth in a single period of gestation than they have lost during the whole of their lives previous to that period, and he believes that they have lost them through the agency of the acidity of the secretions of the mouth and general system. So, he holds, we are warranted in believing that acids do play a very important chemical part in the decomposition of the teeth. The mouth acids, he maintains, decalcify the teeth, and carbonic acid gas is evolved.

It is objected the action of the acid would always be exerted first on the lower teeth and its effects found there first; but the effect of capillary attraction must be considered, for this equalizes the distribution of the fluids throughout the animal economy, by which acids will creep along the tissues to the superior maxillary and into the natural cavities, so to speak, between the teeth, where our trouble often begins. When the system is saturated with iodide of potassium it often has the effect of grooving the teeth at the cervical borders just as though they were grooved with a file. It is difficult for us to tell how nature grooves teeth by absorption, and produces this specific effect ; we can only explain the matter in the indirect and inferential way in which it is done, by showing it can be produced artificially and chemically.

Correspondence.

Sir,—Some few years ago I contributed an article to your valuable journal on the " Abnormal Effects of Nitrous Oxide Gas," which gave rise to some discussion. As an old practitioner, and having had some considerable experience with the effects of this valuable anæsthetic (I have used it for the last twenty years) I have had ample opportunities of testing its varied effects on all classes of patients.

Of course it is useless to attempt to prove that it is a safe, speedy, and effectual agent when properly administered and the gas is pure, but I would wish to draw attention to one particular fact, and that is that nitrous oxide, administered to the patient in the uncompressed form, is most decidedly the best and far superior to gas usually supplied in the compressed state by the dental depôts. I am, of course, quite prepared to have my statement challenged, and, doubtless, the firms who supply compressed gas will join issue with me more especially.

I have used both compressed gas and gas of my own manufacture, and most decidedly I give the palm to the latter, and when prepared from pure nitrate of ammonia and passed through a series of wash bottles containing solutions of sulphate of iron and caustic potash it is everything that can be wished.

I notice this, that the uncompressed gas induces "narcosis" more gradually, and with almost the entire absence of convulsive twitchings and struggling, and, in nine cases out of ten, there is scarcely any "cyanosis," that is the horrible blue and death-like pallor so alarming to friends of patients. It is sometimes impossible to exclude observers from the surgery, and this awful appearance leads to many objections to the use of the gas. Then again I note that complete restoration to consciousness is perhaps slower but more satisfactory to the patient. I, of course, own that we have an inestimable boon in liquid gas, for it enables us to carry the wonderful agent to branch establishments or to the houses of invalids. But I would certainly urge dental practitioners to make their own gas, wherever it is practicable.

I was much struck the other day with a remark of a medical man to whose wife I had administered the gas, for about the tenth time he said to me what a wonderful change, no blueness, no spasmodic twitching, and the whole thing over in half the usual time. I had previously administered liquid gas to her. One of my assistants underwent an operation a short time ago for the removal of an ingrowing toe-nail; we, at his earnest solicitation, gave him uncompressed gas, and the operation (a difficult one) was satisfactorily completed in thirty-five seconds. He assured me that on no account would he have taken liquid gas. I use a very simple apparatus—a gasometer of the usual type, and in conjunction a smaller one, a kind of a governor, and by means of weights and a pulley I can work the pressure to a nicety. The gas passes into a bag and through a Coxeter's face-piece into the lungs. I have tried many inhaling apparatus, but Coxeter's, with the hair-spring valve arrangements, is the best. I think it is foolish to bother with economisers as the gas can be made so cheaply. When once the *modus operandi* of making is fairly got into, a sharp lad, with a little supervision, can manufacture gas with ease. I was formerly much troubled with the breaking of the glass retorts, but of late Messrs. Mottershead, of Manchester, have supplied me with a very handy and shapely flask. This, with a bent glass tube and india-rubber fittings, perforated bung of ditto, provides an inexpensive and satisfactory apparatus.

I remain,
Yours truly,
Wrexham. T. W. COLEMAN, F.C.S.

Dental News.

ODONTOLOGICAL SOCIETY OF VICTORIA, AUSTRALIA.

The annual meeting of the Odontological Society of Victoria was held on March 1st, 1886, in Melbourne, Mr. J. Cumming, president, in the chair.

The Hon. Secretary being called upon for his report, stated that twelve meetings had been held during the year, three of which were special meetings relating to the Dental Act introduced by Dr. Rose, M.L.A.

The meetings were well attended, and the interest well sustained by the communication of incidents of practice and the exhibition of pathological specimens.

Interesting discussions followed the reading of several papers.

The following have been read :—

By Mr. E. C. Carter on "Impressions and Castings."
,, Mr. J. Iliffe on "Dental Caries."
,, Mr. Clark on "Dental Education."
,, Mr. E. Thomson, L.D.S., Eng., on "Extractions."
,, Mr. J. Cumming on "Alveolar Abscess."
,, Mr. J. R. Gurner, L.D.S., Eng., of Adelaide, on "The Increasing Tendency to Dental Caries among Colonial-born Children."

The labour spent upon the Dental Act has not met with success so far, as the Bill did not pass its third reading.

The advisability of founding a dental hospital is now occupying the attention of the committee.

The number of effectual members on the roll is 20, seven names having been withdrawn for various reasons.

The Hon. Treasurer, Mr. Iliffe, read his report, showing a credit balance of £11 17s.

The following officers were then elected for the ensuing year :—Mr. J. Cumming, president ; Mr. A. M. Townsend, vice-president ; Mr. J. Iliffe, hon. treasurer ; Committee, Messrs. Down, Kernot and McGregor ; Hon. Secretary, E. Thomson, L.D.S., Eng.

A vote of thanks to the officers for their labours in the past year was carried unanimously.

J. R. Gurner, L.D.S.E., of Adelaide, was elected an honorary member.

A number of alterations and additions were made to the bye-laws.

Owing to the lateness of the hour the business of the Dental Hospital was postponed.

The annual dinner was announced for April 8th, when the president was to read his inaugural address.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—During the April Sittings of the Examiners the following gentlemen passed their first professional examination for the licence in dental surgery:—John Girdwood, Edinburgh ; William John Fick, Brixton, London, and Charles Maclean Cunningham, Leith ; and the following gentlemen passed their final examination and were admitted L.D.S., Edinburgh :—Edward Percy Rose, Leicester, and John Trude Fripp, London.

DINNER ON BEHALF OF THE NATIONAL DENTAL HOSPITAL.

Alderman Sir Robert N. Fowler, Bart., M.P., the late Lord Mayor, will preside at the first public dinner held in aid of the funds of the National Dental Hospital, 149, Great Portland Street, on Tuesday, the 29th of June next, at the "Albion." 221,452 cases have been attended to since the formation of the hospital in 1861. Steward's fee £1 1s.

BIRMINGHAM DENTAL HOSPITAL.

APRIL, 1886.

Number of patients	882
Extractions	718
Completed Fillings	53
Gold Fillings	7
Miscellaneous	145
Anæsthetie Cases	12
NO. OF OPERATIONS	935

W. PALETHORPE, House Surgeon.

DENTAL HOSPITAL REPORTS. NATIONAL DENTAL HOSPITAL,

MONTHLY STATEMENT OF OPERATIONS PERFORMED, From April 1st, to April 30th, 1886.

Number of patients attended		1511
Extractions	Children under 14	409
	Adults	536
	Under Nitrous Oxide	445
Gold Stoppings		84
Other Stoppings		508
Advice and Scaling		329
Irregularities of the Teeth		227
Miscellaneous		138
TOTAL		2676

ISIDORE FRED. PRAGER, House Surgeon.

WORK DONE AT THE LONDON DENTAL HOSPITAL

DURING THE MONTH OF APRIL, 1886.

Number of Patients attended		2317
Extractions	Adults	844
	Under 14	457
	Anæsthetics	742
Stoppings.—	Gold	164
	Other Stoppings	583
	Advice	128
	Irregularities	103
	Miscellaneous	98
TOTAL		3119

H. LLOYD WILLIAMS, M.R.C.S., L.D.S., House Surgeon.

British Journal of Dental Science.

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PLASTIC OPERATIONS FOR RESTORATION OF THE LOWER LIP AFTER REMOVAL FOR EPITHELIOMA.*

By FRED BOWREMAN JESSETT, F.R.C.S., Surgeon to the Cancer Hospital, Brompton.

In my last paper I dealt solely with Plastic operations as applied to the restoration of the upper lip, either when wholly or partially destroyed by disease or accident. I now propose placing before you the different operations as applied to the restoration of the lower lip when invaded by disease and to illustrate what I mean more fully I will preface my remarks by relating two cases out of a number, that have lately been under my care.

CASE 1.—*Epithelioma involving the whole of the Lower Lip. Removal of growth and the formation of a new Lip by the Author's Operation. Recovery with good Lip.*

T. W., aged 58, was admitted into the Cancer Hospital on the 5th March, 1885, under the care of the author, suffering with a large cancerous ulcer implicating the whole lower lip and left angle of the mouth.

Previous History.—Has suffered much from gout. Four months ago noticed a small pimple like a "boil" on his lower lip at the left-hand corner, which increased rapidly. Patient is a gas-fitter, and is in the habit of using a brass blow-pipe. He is also a great smoker. No history of syphilis. Has been rather a hard drinker.

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* **Read before the West Kent Branch of British Medical Association.**

Present State.—Almost the whole of the lower lip is the seat of a sprouting epithelomatous mass, very vascular, readily bleeding, with deep indurated base extending deeply into the substance of the lip, and hard everted edges. There is an enlarged gland in the submaxillary region about midway between the symphysis menti and angle of the jaw. The left ala of the nose has been ulcerated ; this was removed by Mr. Holmes, at St. George's Hospital, some twelve years ago, and now presents a firm healthy cicatrix. There is a slightly ichthyotic condition of the tongue.

Operation.—On the 10th March, the patient being placed under the influence of ether, I made two incisions (*Vide* Fig. 1), the one extending from the left angle of the mouth to the point of the chin, and the other starting at about half-an-inch from the right angle of the mouth, meeting the first incision at the chin, thus forming a triangular flap ; this was speedily dissected from the surrounding tissues, thus removing all the diseased structures. Another incision was now made from the left angle of the mouth downwards to a point midway between the angle of the jaw and the symphysis, forming a flap of triangular shape, with its base exactly the same length as the first ; this flap was now twisted round, and the two raw edges united with hare-lip pins, the posterior free surface forming the new lip. The gland under the jaw was now removed, and the other raw edges united by means of a few interrupted wire sutures and intermediate horse-hair sutures.

The mucous membrane and skin of the newly-formed lip were carefully united by a continuous horsehair suture, and the whole, after being painted over with collodion, dressed with salicylic wool.

The man made a good recovery and had a capital lip.

CASE 2.—*Epithelioma involving three-fourths of the Lower Lip. Syme's Operation for Renewal of Lip. Satisfactory Result.*

G. H., aged 80, occupation, blacksmith, was admitted into the Cancer Hospital, January 1886, under the care of the author.

Previous History.—Has been a great smoker, usually smoking a short clay pipe ; has frequently burnt his lip with the hot pipe. Fifteen months previously to admission noticed a small pimple on lower lip, which ulcerated, and although he sought advice for this, it continued to increase until it extended along the whole of the lower lip to the left angle of the mouth, which became implicated with the disease.

Present State.—A large ulcerated mass is seen to occupy the lower lip from about a quarter of an inch from the right angle to the left angle of the mouth, which is also ulcerated. The ulcer presents all the characteristics of epithelioma—eroded surface, everted edges, and hardened base. There is one gland which is slightly enlarged under the jaw. The old man being in very good health, and the glandular mischief so limited, it was decided to remove the disease, and form a new upper lip after the method recommended by Syme.

Operation.—The diseased mass having been removed by a sweep of the knife, two semicircular incisions were made extending from the centre of chin to anterior edge of the masseter muscle of the jaw on each side, care being taken not to divide the facial arteries. The flaps thus formed were dissected up, and the enlarged gland removed ; the top of the anterior edges of these flaps were now brought up to a level of the mouth and the edges fastened together by three hare-lip pins. The lower edges were then united with horsehair sutures, and the wound dressed with salicylic wool. The wound healed readily and well, the pins being removed on the fourth day, and a capital new lip was thus formed.

The operations which have been practised and capital results followed, for the complete or partial destruction of the lower lip are varied according to the amount of lip which may be diseased, and may be varied by the ingenuity of the surgeon, to meet the exigencies of special cases.

The following operation, however, will usually be found to be suitable to the majority of cases that come under the notice of the surgeon.

It having been decided to remove the growth by means of the knife, the patient should be put under the influence of an anæsthetic, and placed in the recumbent position. Any broken or carious teeth that may tend to irritate the lip may be removed, as well as any collection of tartar that may be present.

Some operators, for small operations, prefer having the patient seated in a high-backed arm chair, and tied securely in, but I can see no advantage in this, and infinitely prefer having my patient on the table.

The lip on either side of the disease should be firmly compressed between the thumb and forefinger of an assistant; the surgeon then, seizing the ulcer with a pair of artery forceps, and putting the lip on the stretch, makes a free incision at least an eighth of an inch from the ulcer on one side, continuing downwards, and inclined towards the centre of the ulcer, so as to finish the incision about half an inch below and opposite its centre; he then, putting the lip on the stretch in the opposite direction, makes a similar incision extending to the end of the first and thus removing the ulcer in a V-shaped piece. The cut edges should then be brought together by means of two or three hare-lip pins and thick silk twisted over them in the ordinary way. There is no occasion to tie any vessels as a rule, as the pressure of the pins is sufficient to arrest all hæmorrhage. Great care should be taken to insure the careful adjustment of the margin of the prælabium. A fine catgut suture through the mucous membrane here is often an advantage. Some surgeons prefer bringing the edges together with interrupted wire sutures.

It is always a good plan to oil the pins and silk with carbolic oil before introducing them, as it prevents the silk from sticking quite so firmly, and causes less pain when removing the pins. A narrow piece of lint, soaked in carbolic oil, should then be twisted round the pins, and a four-tail bandage, with a hole cut in the centre for the chin, applied.

Modifications of this operation are often requisite to meet the requirements of different cases, and much must be left to the ingenuity of the operator.

In cases where the disease extends very deeply, and possibly the whole or the greater part of the lower lip is affected, some form of plastic operation must be performed. In a case that came under my care a short time since the disease extended from the angle of the mouth, slightly implicating the upper lip to half an inch on the opposite side of the middle line ; it also implicated three-quarters of an inch of depth of the lip. To remove this without at the same time performing some plastic operation would have been to leave the patient in nearly as bad a plight as I found him. He had also an enlarged gland under the maxilla. I cut a V-shaped piece of paper corresponding to the incision I intended to make for the removal of the disease, (Fig 1,) and fixing the apex of the triangle, twisted it round so that it should be at exactly right angles with the first. I marked this out with ink, and then proceeded to remove the growth. In this case, as there was pretty free hæmorrhage, I ligatured the coronary vessels, and then made my other incision, extending it well over the diseased gland, which I removed, and, dissecting up the flap, twisted it round so that it fitted accurately the cut surface of the lip, and fastened it there with stout silver-wire sutures ; by loosening the integument under the jaw I was enabled easily to bring the loose flap up and unite it to the other cut surface.

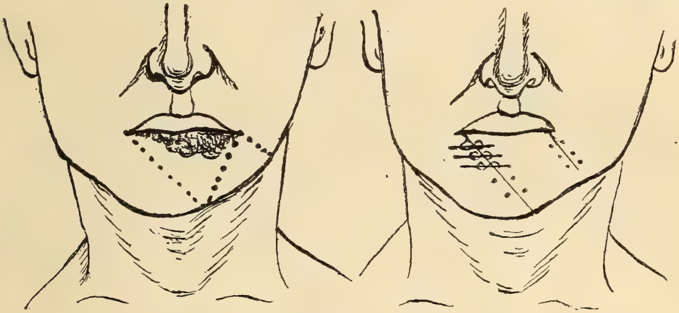

FIG. 1.

This man made an excellent recovery, and had a very good mouth. He died six months after the operation from secondary deposit in the cervical lymphatic glands.

When the whole of the lower lip is affected, and it is thought desirable to remove the disease, the operation described by Mr. Erichsen is an excellent method, and yields good results.

His plan (Fig 2) is a modification of that proposed by Serres. The object of the operation is to raise the lower lip to a level with the incisor teeth. An incision, about three-quarters of an inch in length, is made directly outwards from the angle of the mouth on each side, into the cheek ; from the extremity of this a cut is carried obliquely downwards on to the upper margin of the lower lip, so as to excise the included triangular piece. The lower lip is then dissected away from the jaw from the inside of the mouth, and a V-shaped piece is taken out of its centre. By means of hare-lip pins on each side and a few points of suture, the incisions in the angle of the mouth are brought together accurately, and in the same way the vertical one in the centre is united. In this manner the whole of the lower lip is raised and brought more forward. Care should be taken in removing the cancer from the edge of the lip to leave the mucous membrane rather long (which may be always done, as the skin is affected to a greater extent than it) ; a good prælabium is thus formed, and the restoration effected with but little deformity. Care must be taken to prevent union from occurring between the inside of the lower lip and the gum, by the interposition of a strip of oiled lint.

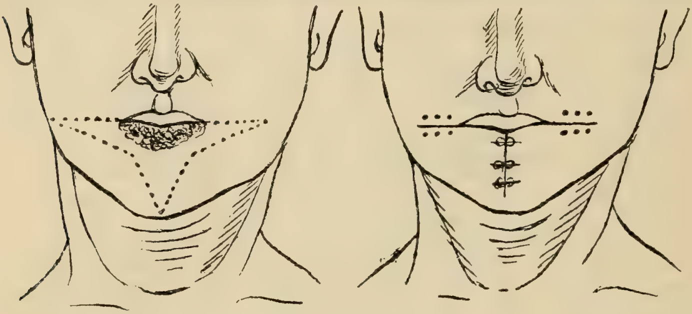

Fig 2.

Buchanan, of Glasgow, as far back as 1841, published an account of a method for restoring the lower lip when affected by extensive cancerous disease, which leaves most satisfactory results.

The diseased part of the lip is first removed by a free sweep of the knife. An incision, B C, is then carried downwards and outwards on each side of the chin, and another incision, C D, upwards and outwards, parallel to and corresponding in length to A B. The flaps formed by these incisions are represented in Fig. 3. They are detached from their subjacent connection, and the whole is raised upwards, so that the original elliptical incision curves into a horizontal line, and is made to constitute the margin of a new lip, the secondary incisions under the jaw coming together in a vertical direction, in which they are retained by pins with twisted and interrupted sutures.

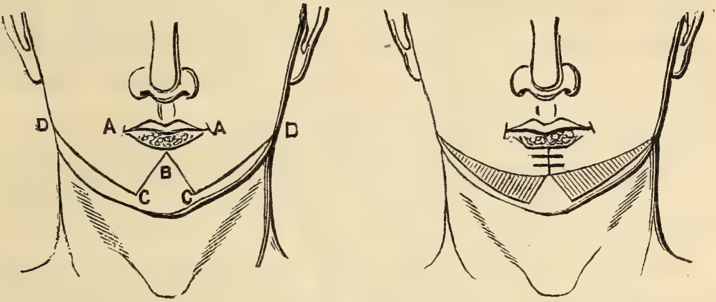

Fig. 3.

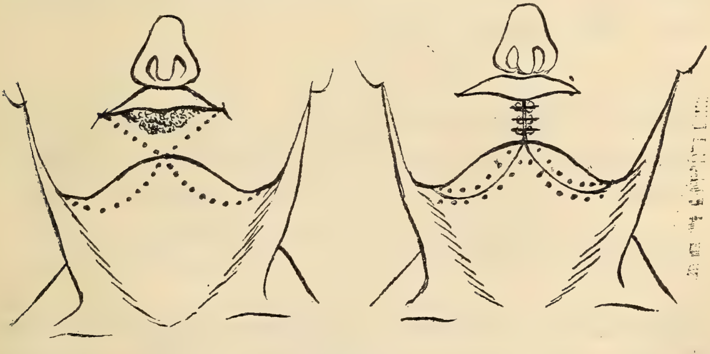

Fig. 4.

Professor Syme has practised, and recommends, the adoption of an operation somewhat different from any yet described. (Fig.4.) He sweeps the whole of the diseased portion of the lip off with a simicircular incision extending from the angle of the mouth on the one side to that of the other ; he then, from the centre of this incision, makes two other elliptical incisions extending downwards and backwards to the angle of the jaw on both sides. The flaps so formed are dissected freely up, and brought together in the middle line, the portion of skin which is left at the chin serving to keep the flaps in position and prevent them slipping down. This operation gives very excellent results. Two cases at the Cancer Hospital, under my care, have been operated upon by this method recently, and the results have been most satisfactory.

In all these plastic operations of the lip it is well to stitch the mucous membrane and skin of the free border of the new lip together ; this heals very quickly, and saves the patient much pain and discomfort.

There are cases sometimes in which the ulcers are very superficial, and in which it is needless to remove a V piece of the lip, which of necessity must considerably decrease the calibre of the mouth. In these cases I content myself with slicing off the ulcer, being careful, however, to keep sufficiently far from it ; I then stitch the mucous membrane carefully to the skin. A case came under my care only a short time since in which a considerable part of the lip, some inch in extent, was eroded, and evidently the seat of epithelioma. In this case I adopted the method mentioned above, with most happy results.

THE MUCOUS MEMBRANE OF THE MOUTH, WITH SPECIAL REFERENCE TO ITS PHYSIOLOGY AND PATHOLOGY, AND THE PART PLAYED BY ITS SECRETIONS IN THE PRODUCTION OF DENTAL CARIES.*

By Edwin A. Cormack, L.R.C.P. & S., L.D.S. Edin.

The subject of the mucous membrane of the mouth is an important one, the whole significance of which has been greatly underrated by the dental profession till within the last few years. In the opinion of many eminent observers its secretions are important factors in the causation of dental caries.

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*Read before the Odonto-Chirurgical Society of Scotland.

To understand the rationale of their operation we must possess a correct knowledge of the connections of the mucous membrane with other parts, its functions and the agencies which its secretions are subjected to in the mouth. In order to fulfil this object systematically we will discuss in succession its anatomy, physiology, and pathological anatomy. The special diseases of the gum I have reserved for discussion at a future period.

The mucous membrane yields a secretion, mucus. The mucus is derived from certain of the epithelial cells which elaborate it within their protoplasm and then extrude it.

Lymphoid elements also escape from the mucosa, and passing through the epithelial cells, reach the surface and form the swollen spherules known as mucus corpuscles.

Mucus is a colourless viscous fluid. It contains the debris of shed epithelium, mucus corpuscles, and mucin.

Mucus corpuscles are nucleated masses of protoplasm, similar in size to white blood corpuscles, but containing, unlike the latter, one or more nuclei. Even at the normal temperature, they exhibit amœboid movements. These cells are probably modified epithelial cells of the columnar variety. Mucin is an albuminoid substance that occasions the viscosity of mucous fluids ; it thereby facilitates the passage of food over mucous surfaces. It is not coagulated by heat, but is precipitated by alcohol and acetic acid. The precipitate is not soluble in excess of the acid. The precipitate swells up in water, but is not dissolved in it ; it is, however, readily soluble in alkalies.

Mucin is largely produced in the mucous glands, and in the secreting cells of the salivary glands, especially in the sub-maxillary and sub-lingual. Mucin, in composition, differs only from albumin in containing no sulphur. Albuminoids contain C. H. O. N. ; like proteids, they yield leucin and tyrosin, one or both, when subjected to hydrolytic treatment. Albuminoids readily decompose into a number of simpler bodies.

GENERAL PATHOLOGY OF MUCOUS MEMBRANE.

The diseases of the mucous membrane of the mouth are generally of an inflammatory character, and are most common in childhood, resulting usually from intestinal disorders, bad hygiene, and want of local cleanliness.

Inflammations may also be induced by noxious substances acting on the external surface of the membrane. The intensity, extent, and duration of the inflammations vary greatly ; and a number of different forms are distinguished accordingly.

Inflammations may be divided into acute and chronic, and, according to their character, into catarrhal, croupous, diphtheritic, and gangrenous.

Hyperæmia is very commonly met with in the mouth—where it is of long standing, it may be referred to the atonic condition of the walls of the blood-vessels from malnutrition. The mucous membrane becomes intensely reddened, and, at the same time, the secretion is increased.

In catarrhal inflammations, the characteristic feature is a morbid increase of the secretion from the membrane. The catarrhal secretion is furnished partly by the blood-vessels and partly by the epithelial cells. There is an exudation from the capillaries of liquor sanguinis, containing numerous white blood corpuscles. This exudation is always mingled with the secretions from the epithelial cells. These cells normally produce mucus from their protoplasmic contents, the columnar cells chiefly ; in catarrh this is much increased. Great quantities of glassy mucus are thus deposited on the membrane along with the normal secretion of the mucus glands.

The inflammation may now subside, and the membrane recover. But should further irritation arise, other changes will take place. The epithelial cells begin to be shed, and secretion is rendered turbid by their presence, then we have what is termed epithelial catarrh.

In the later stages, there is an excessive desquamation of the epithelium an abundant extravasation of the white leucocytes. Many forms of catarrhal inflammation are thus characterised by an almost purulent secretion and are described as purulent catarrh.

Catarrhal inflammations are usually transient ; sometimes, however, the process becomes chronic.

In addition to the alterations in the secretion and the epithelial cells, there is an infiltration of cells into the mucosa, and sometimes into the sub-mucosa. Where the epithelium has been lost by desquamation, repair is effected by multiplication of the remaining epithelial cells.

The inflammation may, however, become intensified, so that the tissues perish over some considearble extent. When the infiltration is extreme, the tissue perishes by necrocis. In this way ulcers are produced. The lymph follicles are often the seat of inflammation and ulceration. Ulcers starting in them are known as follicular ulcers. When catarrh passes into ulceration, the inflammatory exudation usually extends far beyond the limits of the ulcer.

When the inflammation is of long duration, a certain amount of fibrous hyperplasia takes place. The openings of the glands often become obstructed, and they are thus distended into cysts.

INFLAMMATORY AFFECTIONS OF THE MOUTH.

The slightest degree is known as *Erythema.* It is characterized by redness, sense of heat, and sometimes considerable tenderness, but is not usually attended with acute pain. This may rapidly disappear or pass into the more severe form known as

Catarrhal Stomatitis. In this form the surface is intensely red, the secretion of the membrane is increased, and the epithelium desquamates. Over the surface of the gums, lips and cheeks, the redness and swelling are generally uniform, but in the hard palate they may appear in streaks and patches.

When the inflammatory exudation is abundant, clear vesicles are sometimes formed on the tongue, lips, and cheeks, where the epithelial covering is thicker than elsewhere, and prevents the free escape of the exuded liquid. As the vesicles break, small ulcers, covered with a whitish film of detritus, may be formed in their place. The mucous glands become swollen, giving rise to greyish-red elevations surrounded by a reddened areola. When the duct becomes obstructed with mucoid cells, the gland may be dilated into a tiny cyst by the retention of its secretion.

The catarrhal secretion contains at first few cells, but later the proportion becomes increased. The cells are in part extravasated leucocytes, in part desquamated epithelial cells. If the latter remain on the surface they may accumulate so as to form a whitish or discoloured grey and brown deposit or fur.

When the gums are involved they swell and rise up between the teeth, around the necks of which they ulcerate. In some cases this ulceratien does not cease until it has extended into the alveoli and destroyed altogether the connection of the teeth, which become loosened and fall out.

Catarrhal stomatitis is generally the result of some mechanical or chemical irritation of the mucous membrane ; when the irritation is local, like that caused by a carious tooth, the stomatitis is likewise local. There are many diseases which set up inflammation of the mouth. In measles a muscular eruption appears, in scarlet fever a punctate, or diffuse scarlet eruption. In small-pox, chicken-pox, pemphigus, and in foot-and-month diseases there are eruptions of vesicles and pustules, which pass through the same stages as those of the ski

(*to be continued.*)

OPERATIVE DENTISTRY.

BY DR. GEORGE H. CUSHING OF CHICAGO.*

I wish to say a few words, not in apology but in explanation, of the character of this paper.

When I accepted the invitation of the chairman of your executive committee to write a paper on operative dentistry, I thought there were some points in three distinct subjects which might perhaps be profitably considered at this time and grouped under this head.

It was not intended that this should be even an attempt at an exhaustive consideration of the matters referred to, but that it should briefly present points of importance for consideration, the discussion of which could not fail to be beneficial. The points I desire to present are, first, the province of operative dentistry and some of the essential qualifications for its practitioners ; second, some of the constant causes for the failure of fillings ; third, the necessity for greater thoroughness and conscientiousness in the treatment of pulpless teeth.

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* A paper read beforc the Illinois State Dental Society and reported in the *Transactions of the Society.*

The time was, doubtless, when the dentist was expected to confine his operations exclusively to the teeth,—organs which were at that time regarded as of little more importance as to their connection with the body as a whole than other cuticular appendages, as the hair and the nails. His duty was bounded by perhaps three operations,—the filling of such cavities in the teeth as readily admitted of such treatment, the extraction of all other teeth that were in any degree painful, and the rough and imperfect scaling of the teeth when nearly imbedded in salivary deposits.

When such views were held of the relation of the teeth to the general economy, and when their value was estimated no higher than is thus indicated, it could only be expected that the practice of operative dentistry would be considered as simply a mechanical one, and that the qualifications necessary for such practice were correspondingly limited.

To-day, how is it ?

It has come to be understood that the teeth are essentially parts of the living organism, connected through the great sympathetic system of nerves with every other part of the body,—that diseased conditions of the teeth may cause serious disturbance of organs and parts the most remote, and that remote parts may, through diseased conditions, as well affect the teeth. It has also been learned that the teeth themselves are subject to various diseases independent of caries, all of which are more or less amenable to treatment.

In the days when operative dentistry was regarded as simply a mechanical craft the medicaments used by the practitioner consisted almost solely of two articles,—creasote, and opium in some of its forms,—which were used simply to relieve toothache. To-day there are not less than twenty or thirty remedies which the intelligent dentist regards as essential in the local treatment of various conditions, without referring to the many constitutional ones that are frequently indicated, all of which are more or less efficient in aiding nature to effect the cures of the various ailments to which the teeth and adjacent parts are subject.

There are many diseases located in the teeth alone, while of the adjacent tissues may be mentioned as some of the more frequent, hypertrophy of the gums, inflammation of the gums, recession of the gums, pericementitis, pyorrhœa alveolaris, alveolar abscess, various affections of the antrum of Highmore, and necrosis of the alveolar process ; and it is continually necessary to treat the teeth in order to relieve diseased conditions in other parts of the body, especially in the eye and the ear. All these diseased conditions, presenting great variety in their characteristics, it is expected that the dentist of to-day will be fully competent to treat, and patients are placed in his hands with the confidence that he is thus competent. Beyond the conditions above enumerated, certain surgical operations and treatment properly lie in his province, such as the setting of broken and dislocated jaws, the removal of certain necrosed parts and of certain tumours of the gums, and the like, and the general practitioner of dentistry should be competent to deal with such cases.

Now, what qualifications are necessary for the performance of these duties ? For the intelligent performance of the mechanical operation of the filling of teeth alone a man needs to understand the laws of physics and mechanics, and to be trained to a keenness and nicety of observation and a delicacy and skill in manipulation not required in any other pursuit. Before a man can be justified in attempting these mere mechanical operations, no matter how skilful a manipulator he may be, he must be competent to decide when it is proper to perform them, or what preliminary treatment is required, if any. This necessitates a knowledge of the relation of the teeth to the general system,—of the various sympathetic symptoms which diseased teeth may give rise to, or, on the other hand, that may appear in the teeth when originating in diseased conditions of remote parts, and also an acquaintance with the action of the various remedies it may be necessury to employ. This knowledge can only be obtained by the study of the nervous system and of therapeutics.

When we get beyond the mere mechanical operations and the judgment which should determine their performance, and come to treat diseased conditions other than that of simple caries, we find ourselves entering the domain of physiological activities, and must be familiar with the laws governing these, as well as with those determining their various aberrations which aberrations cause what are termed pathological conditions. Here, again, we must be familiar with the more numerous remedial agents we have occasion to use,—their mode of action, their possible dangerous properties, and their value as aids to nature in her efforts at restoration to health. Only the study of therapeutics and materia medica can qualify us in this field of practice. When we come to the treatment of abscess, the setting of broken or dislocated jaws, the treatment of necroses, the removal of tumours, or the explortion of the antrum, we must have added to all the qualifications heretofore enumerated a thorough knowledge of the anatomy of the parts we are to operate upon, and as well of the principles of surgery.

These propositions are simple aphorisms,—they cannot be disputed,—and, in view of this, is it too much to insist that young men entering upon the practice of operative dentistry should so qualify themselves as not to bring reproach upon the profession of their choice, and that they should realize that when they have technically completed their education,—that is, the course of study required by the schools,—they have only just laid the foundation of their education, and that the superstructure can only be carried to completion by the closest and most constant study through life ?

When those seeking to enter the ranks of the dental profession come fully to realize this, then we may hope for a progress in the true professional sense such as the past has not yet witnessed. The signs of the times are propitious to this end. The public mind is being educated and demands a proper qualification of its professional men ; the schools recognize the importance of a more thorough training of their pupils and are continually advancing their standard, while the young men entering upon such study are more generally, though in a dim way, realizing the importance of the suggestions here so briefly presented. We may, then, hope that the next decade shall develop a class of professional men who will bring credit and honour to our ranks, and whose ministrations shall have a greater beneficence in proportion as their qualifications and earnestness are greater.

I come now to speak of the second subject—some of the constant causes of the failure of fillings. That there are constantly operating certain causes which result in the failure of fillings, needs not to be stated. The daily observation of every one of us too sadly tells the tale. Some of these causes are appreciable, while others are not. It is only of the former that I propose to speak.

The first cause to which I would call your attention is the improper or imperfect preparation of cavities. It is safe to assume that a very large proportion of cavities are not as thoroughly prepared as they should be, and as many of them could be. As a rule, cavities are not sufficiently enlarged at their margins to entirely remove, not only that which is completely disintegrated, but that which is partially so This may occur where cavities are so situated as to be reasonably well examined by the eye, but is very apt to be where the cavities cannot be thoroughly examined in that way. Even those cases, or many of them at least, which appear to the eye to be perfectly prepared would, if they could be examined out of the mouth with a microscope, present unmistakable evidence of minute points of imperfection which sooner or later would prove destructive. The only remedy for this cause is to be found in a greater thoroughness in our practice,—that is, by cutting away much beyond the line that may appear to us to be perfectly sound ; for there is doubtless an infected zone around the margins of most cavities that perhaps the strongest lens applicable to this position would fail to reveal, which is in the earliest stage of disintegration, and would under unfavourable conditions break down. In this connection I think a more general use of the lens for critical examinations of the margins would materially reduce the failures due to the cause we have been considering. Again, cavities may be perfectly prepared as regards the removal of all diseased or even infected territory, and yet by reason of our having left weak or thin walls of enamel overlapping, the fillings will be in constant danger of failure by the breaking down of these frail points—a failure which is certain to occur sooner or later. The remedy for this is obvious,—*i. e.*, not to leave any such weak points standing, but *cut* them away, so that they cannot *break* away. The second cause to be mentioned is one which is prolific of mischief doubtless to about the same extent as the first,—as regards proximal cavities,—and this is the failure to perfectly adapt the gold to the margins of the cavities, particularly the cervical margins. This is largely due probably to the exclusive use of cohesive gold, which is much more difficult of application in these positions than the non-cohesive. To obviate this cause of failure, the use of non-cohesive gold at the cervical margins, with a more thorough and careful manipulation at such points, should be practised. It is not claimed that cohesive gold *cannot* be as perfectly adapted to the margins as non-cohesive, but that the majority of operators would be more successful in the use of the latter.

(*To be concluded.*)

THERAPEUTIC INDICATIONS IN DENTAL CARIES.

By Dr. E. Magitot,*

Membre de la Société de Chirurgie Lauréat de l'Institut et c.

Part II.—*Continued from Page* 410.

THERAPEUTIC INDICATIONS OF EACH PERIOD OF CARIES.

A. Indications of the first period. During the first period of caries, the enamel being alone altered, it may be one portion of it alone being thinned on the whole, the lesion however, is slow in progression; in this shape it is very often unrecognised, as it does not give evidence of its presence, but is a subjective symptom save for the presence of a little white chalky patch when the caries is rapidly progressing, or by a corresponding black patch when caries is of slow advance. In the dental interspaces, for example, this alteration is often imperceptible, the points where they are met with are the lateral borders of the incisors where the caries is often double, being on the contiguous sides of the two teeth. It invades, by direct contagion; ridges, or irregularities appear upon the grinding surfaces of the molars or primitive or congenital depression upon the crowns of certain teeth depressions well known to clinical observers become the place of election for this malady.

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* Translated for the *British Journal of Dental Science.*

It may be remarked, under the last conditions, a furrow which penetrates into the thickness of the enamel nearly constitutes a loss of substance in the tissue in every way similar to what occurs in caries itself.

It appears, then, right to remark that for many teeth among predisposed subjects, caries, when it is produced in these situations, where the loss of enamel substance has occurred, in fact encroaches upon the second period, the first being represented by the congenital perforations of the enamel coat. Wherefore, in lesions with the first period as defined above, we have to consider the therapeutic indications of the two terms, viz., treatment of accidents and isolation. In the absence of accidents, intervention is reduced to the second of these terms. We often observe that in practice a certain number of cases are met with of superficial caries, where extreme sensibility exists which one is tempted to classify as belonging to the first period. This, however, is a mistake, for the first period should be rigorously limited to the enamel which is composed of wholly inert tissues, and would not in any case be endowed with sensibility.

All cases of caries rendered painful by the contact of instruments or by changes of temperature are superficial only in appearance, for a careful examination will reveal that the caries has traversed beyond the enamel and has constantly bared the surface of the dentine. We may add that this surface is one of the most sensitive of the regions of the dentine in fact which is due to certain anatomical peculiarities which we shall return later. The therapeutics of the first period having regard to isolation achieve this principle by two procedures which differ according to the case. If it be a cavity on the grinding face of a molar, immediate filling is indicated. The carious patch properly prepared is separated with the dissociated and bruised enamel prisms, and replaced by the most unalterable and resistant material, that is to say, gold. If, on the other hand, it is met with in superficial spots on the lateral border of an incisor, stopping only becomes possible if the cavity is sufficiently regular and lends itself easily for the retention of a foreign substance. Such cases do present themselves, but it is more usual to find resection indicated, that is to say, a complete removal of the injured enamel coat. The operation of resection is effected by means of files, gouges, raspitories, and it has for its object the removal of the diseased enamel, leaving a bare surface of healthy substance, and by transforming into a smooth and polished surface a cavity whose progress is, as a rule, rapid. This resection, by means of a file, has further the advantage of producing an interval between the teeth equal to the thickness of the instrument employed, an interval which removes the resected surface from the likelihood of becoming the receptacle of food, *debris* or any other material likely to give rise to or develop the disease. And further, it isolates the corresponding side from the contiguous tooth and so removes the chances of infection from this source. Such is the formal therapeutic indication in so far as concerns caries of the first period, and these considerations are sufficient to show that we do by no means intend to extend the practice of resection beyond that of the enamel coat, if the lesion has attached subjacent dentine. Such was not the method of practitioners formerly who often had recourse to resection for caries when it had already got beyond the enamel and invaded the dentine. The resected surface was then composed no longer of a smooth layer of enamel, polished, and not liable to fresh attacks, but by a layer of dentine usually sensitive, and then requiring various applications such as astringents, caustics, or the actual cautery.

Doubtless, some cases of recovery were thus accomplished, but then, what subsequent accidents occurred often of the most serious nature ?

Sometimes the most unconquerable hyperæsthesia of the resected surface, pulpitis following with strangulation, gangrene of the organ with its result, discoloration of the tooth, nor must we forget the irreparable mutilation which is inflicted upon the crown of an incisor by the loss of substance thus exaggerated. We now pass to the indications of the second period.

THERAPEUTIC INDICATIONS OF THE SECOND PERIOD OF CARIES.

B. The second period of caries, or when the caries extending to the most superficial surface of the tissue immediately underlying the enamel, or as far as the deeper layer bordering upon the pulp, will comprehend the most varied indications corresponding to the alterations and conditions of parts affected, for the tissues of the dentine are overlaid as is well-known by very fine fibrillæ endowed with extreme sensibility and the disposition of this fibrillæ is such that the superficial layer of the dentine is, on account of the disposition of the network of the fibrillæ, one of the most sensitive. Then, if this first layer is past, the tissue met with is notably less sensitive, but that which is in the neighbourhood of the pulp is again more sensitive. Thus, from the point of view of sensibility and accidents, one must distinguish in the second period several secondary degrees, the first answers to the disposition of the surface ends of the fibrillæ, the second to the layers below these, the third to the layers of dentine superjacent to the pulp. The first and third are thus the most sensitive, the second infinitely less so, but not only are these distinctions of intensity but also those of a general kind. Every case of caries of this period owes its sensibility to external agents, and is determined by such accidents as are provoked by chance occurrences but are not spontaneous, the only accidents of the last nature being due to the central pulp which only takes place very rarely in the course of the second period.

To be continued.

British Journal of Dental Science.

LONDON, JUNE 1, 1886.

THE *STATUS QUO* OF THE PROFESSION.

Following the strictures we found ourselves compelled to make upon the authors of a pamphlet libelling English dentistry, we may perhaps ask ourselves how it is that such taunts and sneers could ever have seen the light. The questions of dental education and the intellectual and social status of dentists at the present day are not only of interest but are also of vast importance. The education of students at the present day is fairly satisfactory when compared with the training sought for and attained in other professions, and is preeminently satisfactory when compared with that of the "good old times." We have no longer the reproach that our students have no chance of learning practically their profession. Those who will, can while at the dental hospitals, attain skill and experience both in operative and in conservative dentistry. The harpies who formerly battened upon the poor and needy, and for a small fee tore away teeth whose preservation was simple and easy to the average student, now find themselves compelled to seek some knowledge of dentistry to avoid losing their patients. The weak point as we stand at present is the preparatory period of the dental career, the time spent before the dental hospital is entered. Although in many cases great and permanent benefit ensues to the student from his early training, yet it too often happens that an idle or a careless lad is left to follow his own devices, and so passes on to his hospital career very ignorant, with the crudest of notions about his future, and certain of but one thing, which is his own personal importance. Too often also the student enters upon his life's work woefully ignorant in general subjects. The "Humanities" are unknown to him' and indeed beyond the three "Rs" he cannot be said to have mastered anything. For examinational purposes he runs up a jerry-built knowledge of "Cæser," or even crams off a book or two of Euclid, but the rubicon passed he displayed an ingenuous ignorance of all such occult stuff, and even if he refrains from bon-firing the hated volumes of his educational library it is not from any reverence to "Barnard Smith," "Colenso,' or Cornish's cribs. Unfortunately in these days of keen competition the general public have become critical on most matters. They come to us to have their teeth tended but they really expect a great deal more. Skill, precision, punctuality, and cleanliness are simply essentials; unless all these are combined the public relegate the dentist to the limbo of muddlers. First-rate men combine such qualities and some make piles of wealth, and some are failures. The simple explanation is to be found in the individual, the man as distinct from the dentist. It has been taken for granted now that the profession of dentistry does not octracise its members from polite circles, and so the patients learn to discriminate between the skilled illiterate, and the skilled man who further has culture, wide and elastic tastes, and, it may be, has evinced ability in some walk of life outside the narrow limits of the dental atelier. Just as the child is father of the man, the student is parent of the practitioner; the ill-informed, slovenly, careless student culminates in a professional man whose failure, greater or less, according to his ill or good fortune, is determined by his display of ignorance, his neglect of detail, and abuse of privilege. Constantly we are astounded by displays of ignorance of even the scientific side of their profession, where dentists reveal mistakes upon which the well-informed lawyer, or man of letters is ble, and does set the dentist right, thereby heaping obloquy upon the profession to which he belongs. As certainly as the waters reflect the clear blue sky, so does a man's after career mirror his earlier life, its chances, its efforts, and its courage or cowardice. The importance of a thoroughly good, general education, can hardly be over estimated in the case of the dentist. He is brought into such close and personal relation with his clients that they cannot fail, sooner or later to find out the weak points in his armour, and draw their own conclusions, favourable or unfavourable as the case may be.

EXAMINERSHIP AT THE ROYAL COLLEGE OF SURGEONS.—The dental examinership is again vacant, and it seems likely that a very keen competition is likely to exist between the applicants. It is rumoured that, among others, Dr. Walker, Mr. Hutchinson, Mr. Storer Bennett, and Mr. Morton Smale are likely to seek the coveted position of honor.

THE election of an assistant dental surgeon at the London Dental Hospital will shortly take place. The applications have to be in by June 21st. We believe several gentlemen are already in the field.

THE FIRST DENTAL STUDENTS' TENNIS CLUB.—The students of the Dental Hospital of London have started a lawn tennis club which bids fair to be a great success. At a recent meeting to decide the important point "Who shall be Captain?" some excellent tennis was played, Mr. Morley defeating Mr. Rouw for the final. The club is nominally under the presidency of Mr. S. J. Hutchinson, but is managed strictly by the students themselves who, acting in the way that has of late years characterised their conduct, have shown themselves quite capable of "minding their own business." The club grounds are at Lillie Bridge, a most accessible rendezvous, being within reach by Metropolitan, omnibus, or road car. For members, present or past students or staff of the London Dental Hospital, this first-rate ground offers an immense boon, as it is open all day and every day, and there are so many courts that there is but little fear of anyone "waiting out" long. The club colors are two shades of blue, a dark stripe on lighter ground. We wish the club all success, as it is carrying out our favorite maxim, *mens sana in corpore sano.*

SOCIETIES' MEETINGS FOR THE AUTUMN.—The British Dental Association meet in August, in London, and probably one of the most successful meetings yet held will be the result. The British Medical Association meet in Brighton the last week in July, while the British Association commence their sittings on the 1st of September at Birmingham.

USEFUL HINTS.

The *Chemist and Druggist* says :—Six parts of sulphur, six of white-lead, and one of borax, thoroughly mixed and wetted with strong sulphuric acid, make a strong cement for connecting ironwork.

Aromatic Myrrh—A Mouth Wash.—Myrrh, 6 oz. ; guaiacum, 3 oz. ; nutmeg, 1½ oz. ; cochineal, 6 drachms ; oil of rose, 2 drachms ; deodorised alcohol, 6 pints. Powder the drugs, macerate them in the alcohol one week, filter, and add the oil of rose.

The cutting of indiarubber may be greatly facilitated by moistening the knife used with a moderately strong solution of caustic soda.

A Timesaving Method of Numbering Plaster Models.—Mr. W. H. Kirton, L.D.S.I., suggests the following plan which he has found prove very useful in his own practice. He selects a medium-sized fissure burr, which he works in the usual way by means of a dental engine, taking care that the wheel is driven away from the operator. The plaster model is held in the left hand, and the burr, attached to a straight hand piece, is guided by the right hand, thus enabling the operator to number the plaster in a much shorter time than by any of the rough-and-ready methods in use.

An Antiseptic Tooth Wash.—Dr. Magitot recommends the following as an excellent cure for fetid breath and diseased secretions of the buccal cavity :—Borax, 15 grains ; thymol, 7 grains ; water, half a pint.

The Pharmaceutical Society's Conversazione.—This re-union, always pleasant, was exceptionally agreeable this year. The number of guests was very large, and gave evidence of a full appreciation of the exertions of the president and council. Besides the usual military bands, there was an excellent concert held in the Lecture Hall, and Mr. Winn provided some first-rate glee-singing.

HYDRONAPHTHOL THE NEW ANTISEPTIC.—Merck, writing in the *Pharmaceutische Zeitung*, gives an account of this body somewhat different from what had been received previously. He urges that this body is, in fact, one and the same with the B-naphthol already well known, and asserts that it has no properties, physical or other, which enable one to discriminate the one from the other.

TO INCREASE THE ADHESIVE PROPERTIES OF PLASTER.—Dr. H. R. Kelly, of Galion, O., writes in the *New York Medical Record* that a sponge, saturated with stronger ether, passed lightly over the surface of adhesive plaster, will cause it to stick firmly to the skin. No heat is necessary, and the plaster will adhere closely over its whole extent. Spirits of turpentine will act in the same way.

WHY DO INDIANS HAVE SUCH GOOD TEETH?—The secret of the extraordinary longevity among the Indians is their simple diet and regular habits. They themselves say that when an Indian goes into service and eats the food of the white man, the Indian's teeth begin to decay. Their perpetual grinding on tortillas keeps their teeth white and the lime in the tortilla makes teeth bone.

DENTISTRY IN AFRICA. — *Caulk's Annual* says: —The negroes of the lower Congo region, although not very cleanly, generally take good care of their teeth, washing them with water after each meal, using their fingers in lieu of the brush. The different tribes sharpen their teeth with stones, using them as files and so cut them into various shapes other than the natural. One tribe grind the incisors wedge-shaped, another trapezoid, while another makes them resemble the teeth of a saw. It may be interesting and satisfactory for some to know that these tooth-decorating tribes are strictly vegetarians.

A BOTTLE of bromine with the stopper out, left in a closed room over night, will destroy infection as well as insect life. It is thought to be more effectual than the fumes of burnin sulphur. So says the *Dental Register*, but we are bound to confess that the remedy may prove worse than the disease. We once had the ill-luck to break some bromine tubes in our consulting-room, and the result was that the air was too pungent for comfort for some days after. *Verba sap.*

Abstracts of British & Foreign Journals.

CORRESPONDENZ BLATT FUR ZAHNARZTE.

ON THE ROTATION METHOD.

By Wilh. Herbst, Bremen.

Herr Herbst speaks very highly of the agate instrument, which he has used with great success in the rotation method. This instrument, the point of which is of stone, he describes as being of the greatest use in cases where much stopping is required; but where the cavity is very small it is not of much use as the instrument cannot be made as fine as those of steel. Some he obtained from Herr C. Route, of Dusseldorf, having very fine stone points he found broke off very easily, and so were useless. He strongly recommends the bloodstone as the best for this purpose and these only of the harder kind, as the softer is apt to colour the edges of the cavity with red. The grain of the stone should also run parallel with the length of the instrument. It is the use of stone points instead of steel which is such an advantage in the rotation method and it is of little consequence what kind of stone is used, either cornelian, granite, jasper, tiger or catseye, agate or bloodstone.

Bloodstone is generally to be preferred because on account of its internal hardness a longer and finer point can be made out of it in this, its only superiority. When merely a short, or rather, blunt point is required, any hard stone may be used. Broken points may also be utilized by carefully cementing them again into the steel holders with shellac and are often of the greatest use in gold stopping and last for a long time.

In placing, and even more in condensing, of gold filling the stone pointed instrument is far better and easier than the steel.

The stone polished instruments are used in exactly the same manner as the steel. After three or four layers of gold according to the size of the cavity have been pressed under pressure of tolerably thick hand instruments into the bottom of the cavity, this layer is condensed with a suitable stone instrument. This will cause the whole surface under pressure and rotation to become smooth and even, afterwards this gold layer must be gone over with a fine hand instrument and every vacant place and inequality must be afterwards filled up with small cylinders. The better the first layer is, the more easy will it be to get the next even and regular. Great care should also be taken in planing the last layer, and in large surface it is best to use thicker gold for this layer, for example leaf gold No. 10 Von Wolrab. The first layer as soon as placed must be made firm by means of heat and strong pressure. Gold is wonderfully durable, indeed a gold cylinder will sooner break in two than become loosened from its position. This firmness is still increased if after the use of the stone instrument, the whole surface is gone over once with a steel instrument previously rubbed with sandpaper. Cavities which are large and deep require 6 to 10 layers for effectual filling and neither too little nor too much gold should be used. Herr Herbst remarks that in using the rotation method one should guard against self-deception, and particularly in the use of the above instruments. In the rotation method rightly used the same weight will be obtained as in hammer filling, but this method has this advantage that the filling can much more easily and quickly be placed and can be made to lie so much closer to the walls of the cavity, besides being less painful.

The following cases prove the truth of the above remarks and given by Herr Herbst as his own experience. In case 1 the filling was of unheated cylinders of a thicker kind No. 0 (Wolrab) placed by means of a polished agate pointed instrument. The filling lay very well, but the single layers did not sufficiently cohere and the filling was not hard enough.

The stopping in No. 2 was condensed by the same stone which, however, had been previously sharpened. The cohesion was undoubtedly better, the adhesion to the walls of the cavity good, the stopping was harder and heavier than in No. 1.

The third operation was carried out by the introduction of a hand rotation instrument into the cavity, the stopping was condensed by an agate instrument previously sharpened, and then carefully gone over with a fine hand instrument. The cohesion of single layers was very firm, the weight of the stopping was greater than Nos. 1 and 2 and the adhesion to the walls of the cavity excellent.

No. 4 with hand and machine rotation instruments of steel for condensation resulted in the same way as No. 3.

The last No. 5 was performed by means of a hammer the weight and cohesion of layers was the same as in No. 3 and 4, the adhesion to walls was very unequal, in some places the filling was harder and in some softer than in 3 and 4. All the rotation fillings were accomplished in a very short time, and large cylinders were used. The placing of the hammer filling demanded at least three times the space of time and medium sized and small cylinders were used.

In using stone instruments for condensing they should never be thicker than the steel wire which fits into the hand piece of the drill machine, indeed better still finer if possible. As before mentioned bloodstone on account of its hardness is best for deep cavities when a long point is required while for smaller superficial cavities any kind of hard stone is of use and for these broken points may be utilized as above suggested.

MONATESCHIFT DES VEREINS ZAHNKUNSTLER.

CRACKED AND BROKEN TEETH.

A. Wolter, Berlin.

A. Wolter, of Berlin, gives the following instance of the rapidity with which dental operations may, under extreme pressure be carried on. It appears he was one afternoon in the winter visited by a young lady, by profession an actress, who was in great distress at having broken some teeth. She wished him to make her a set consisting of two lateral incisors in caoutchouc and a protective plate, and this she most urgently entreated him to do in the course of three and a half hours when it was absolutely necessary for her to use it, as she had to appear in her professional capacity that evening. When the unfortunate lady, who was neither *prima donna nor premiere danseuse*, had duly impressed Herr Wolter with the urgency of her case and had enlarged upon the strictness and severity of the stage director, he yielded to her request and undertook to fulfil her desires.

There was little time to be lost as it was already 3.0 o'clock, and the whole thing had to be finished by half-past seven. To increase the difficulty, the large incisor was soldered to the protection plate, and this being of composition metal had broken off. On the back of the metal a piece of the protection plate remained, so a new plate was soldered over this stump and all went well until the tooth was removed from the plaster plate, which on account of extreme heat had to be done much sooner than is customary. The operator's hands he says, were either too cold or wet, for when he tried to grasp the tooth, he found it impossible to attain his object, for not only was it simply cracked but with its cracks in every direction it had the appearance of a piece of frosted glass. Even the use of a magnifying glass did not show the destruction which appeared on the upper surface ef the teeth in a milder light.

Meanwhile the time was going on, four o' clock had struck and the work was as yet only in its first stage. Pity for the poor actress and her terror at the stern director made Herr Wolter resolve, in spite of the unpromising appearance of the teeth to vulcanize the piece and so eventually to make it serviceable. To his astonishment upon opening the vulcanizer and taking out the piece, not a trace of a crack or break was anywhere to be seen on the teeth, they looked as perfect and as smooth as if just come from the dental depot. There was no need to apologise in any way for the piece which was perfectly successful, and the lady paying her fee and overwhelming Herr Wolter withdrew.

Almost the same thing happened to Herr Wolter on another occasion. He had to make some separations in the same hasty manner and after soldering, took the tooth out of the fire placing the plaster plate upon a table upon which were a few drops of water. The hot plate must have come into too close contact with one of these drops of water and a slight hissing arising, the plate was quickly siezed and removed, and the tooth as quickly removed from the moistened plaster, but too late. The tooth assumed immediately the cracked appearance described in the first instance. But as in that case when the tooth was taken from the vulcanising furnace it appeared perfectly unharmed. Herr Wolter merely states his two experiences but can offer no explanation of his curious success.

Literary Notices and Selections.

AN INTERESTING MESMERIC SEANCE.

Professor Kennedy, the well-known mesmerist was asked to hold a private *sèance* at 44, Rodney-street, Liverpool, by Messrs. Lemmens, Cottrell, and Newton, who have taken a great interest in mesmerism. These gentlemen sent out invitations to several of the leading medical and scientific gentlemen of the city, and the result was a unique gathering of professional men who were anxious to test the powers which the professor is credited with possessing. We have been furnished with the following report of the sitting from a medical point of view :—

The scepticism which relegates mesmeric operations to the class of conjuring tricks is confined chiefly to those who have a very superficial acquaintance with its phenomena, or to whom the arrogance of denial and doubt offers a convenient assumption of superiority. Such were only sparingly represented, as most of those present at the professor's exhibition were scientific and professional men. Some of the professor's experiments proved that mesmerism—we use the popular title for want of a better—is a totally unexplained force or influence. For instance, what is called animal magnetism, electrobiology, the power of a strong will in impressing suggestions on one less developed, the conveyance of mental impressions of one mind to the senses of another, and similar theories may be made to explain the ordinary mesmeric phenomena as exhibited by other operations (and many of those brought forward by the professor, such as the insensibility of the subjects to the pain of needle pricks, burns, and the extraction of a difficult-placed tooth.) Yet so such theory and no explanation hitherto offered by Drs. Beard, Hammond, Carpenter, or other eminent writers on the subject will explain the permanence of an illusory, complex, or sensory impression attaching itself to one of a number of exactly similar objects, however those objects be mingled and arranged, without the professor, his dupe, or indeed, anyone in the world knowing the position of the one object so selected until it be examined for some slight and hidden determining mark. What struck us as singular was the facility with which the professor sent the young men who were his subjects into a state of coma, and their total insensibility to pain while in that condition. Several of the spectators were furnished with needles, which they passed through different parts of the flesh without the youths feeling the slightest sensation. One stripling about eighteen years of age, who had a decayed tooth, had it extracted by Mr. Newton, and so far from evincing any symtoms of the operations or moving a muscle, he commenced to sing immediately after it had been drawn. Professor Kennedy placed before the subject a number of ordinary visiting cards, and told him that one of them (which was marked on the other side) was the portrait of himself. The cards, after being mixed by one of the gentlemen present, were laid before the subject, and he instantly selected the one which was supposed to be his likeness. This was done twice, so that it was impossible that there could be any collusion. What impressed us considerably was the total unconsciousness of the "patient" when his tooth was being drawn. It was exactly as if the individual had been under the influence of a strong anæsthetic. When brought to his normal state he was incredulous at having lost a tooth, and could not believe it until he felt the vacuum which had been made. One or two of the subjects were thrown into a state of catalepsy, and whilst "suspended" in a horizontal position between two chairs, sustained the weight of a heavy man without being moved in the slightest from the inflexible rigidity which their forms presented. This was certainly extraordinary, regarded as a physical fact that the mouth of a lad who had swallowed a pot of strong mustard, mixed with cayenne pepper, under the delusion that it was honey, subsequently presented no symptoms of inflammation.—*Liverpool Daily Post.*

THE ARSENICAL TREATMENT OF TOOTH PULPS.

(*Continued from page 428.*)

It can be moistened with sandarach if desired, but I do not consider it necessary, and rarely use it. All other cavities than these I have just mentioned require greater care to properly retain the medicament. It will be readily recognised that if the arsenic escapes from a cavity, the margin of which impinges upon the gum, death of the tissue just in proportion to its invasion will follow, and to prevent this, especially in proximal cavities, is often very difficult. Adhering still to cotton as the best plug when applicable, it must be accurately adjusted while the cavity is *dry*, and while still in this condition saturated with a solution of sandarach or shellac. If the walls of the cavity are so badly broken down as to make the retention of the plug unlikely, and ligatures cannot be used to bind it in place, we are obliged to resort to other means, and oxychloride of zinc, gutta-percha, or zinc phosphate, can be used. But it must be remembered that they lack the element of porosity, and therefore need earlier removal. The two latter have another objectionable feature ; it is exceedingly difficult to apply them without producing pressure upon the pulp, and pain as a concomitant. *Any application that produces pressure upon the pulp as evidenced by pain is faulty, and should be removed at once.* Attention to this will save your patients nights of agony. The oxychloride acts very nicely in such cases, and can be made to adhere to an almost flat surface if dry. Its use occasions some pain (momentary), which can be decreased by mixing it pretty stiff.

It becomes occasionally necessary to destroy a pulp that is not exposed by the cavity ; in such a case, make the application as usual, but allow it to remain only twenty-four hours, when the pulp can be approached with little or no pain, and the arsenic applied directly.

Having now placed the arsenic in position, and taken proper precautions for its retention in the cavity, how long shall we allow it to remain ? The teachings, both by text and precept, still continue to be that it is dangerous to permit arsenic to remain in a cavity longer than twenty-four or at most, forty-eight hours. It is strange that this opinion still persists, in spite of the many opportunities every practitioner has had to demonstrate its falsity. Hundreds of times I have made appointments, which for some reason have been broken, and the arsenic which I designed to remove at that sitting, has remained in the cavity for weeks and months without harm. Others relate similar experiences. The following case occurred when I first commenced practice, and will serve as an illustration of the folly of such teaching :

I made an arsenical application for a lady patient, and appointed a time for her return. She didn't appear. The next day passed—uneasiness on my part—another and still another day, and no opportunity to remove what had now become a night-mare to me. The fifth day I could stand it no longer, and slipping a pair of forceps into my pocket, I went to the lady's residence, expecting nothing *less* than that my patient was in bed with a face swollen all out of shape. I was greatly relieved when she met me at the door. She had had company—couldn't come—would be down to my office that afternoon. That day she left town. *Three months* afterwards I removed that application, cleaned out the canals, filled the tooth, and all was well. She said she never had a tooth filled so easily in her life. It was a case of vicarious sacrifice. It was I who suffered.

We have had several cases of deaths *ascribed* to arsenic used as a pulp divitalizer. One occurred not long since. How does this happen? Easily enough. The attending physician, unable, from obscurity or ignorance, to make a correct diagnosis of the case, charges it upon the arsenic, and the dentist who put the plug in the mouth, *who ought to know better*, and whose ignorance is directly chargeable to his preceptor, or Alma Mater, permits the charge to go unchallenged. Suppose, in a case of this kind, a suit for malpractice was brought on the ground that the arsenic had been left in the cavity a week or ten days. (We all do that occasionally, in spite of the books.) What chance of acquittal would the defendant have, if the teachings and opinions of the profession were cited to the average juryman? In self-defence we ought to demand a change.

The dangers from causing the arsenic to remain in a cavity longer than the prescribed time are said to be, first, poisoning from absorption of the drug: second, periostitis, necrosis, etc., from its action through the apical foramen. Arsenic used as we used it *cannot be absorbed.* Acting primarily and immediately as a caustic, it destroys as far as it reaches, and absorption is impossible. It has been used for centuries in the form of Come's powder for cancer, and in the hands of quacks has been applied to every available portion of the human anatomy, and large growths eaten out by it. If arsenic be diluted or reduced by admixture with other substances until it no longer acts as an escharotic, or but weakly so, absorption is imminent; but I believe it to be without danger as long as it is destructive. Dr. Ringer says: "The absorption of arsenic can be effectually prevented if sufficient be employed to excite active inflammation for inflamed tissue loses the power of absorption more or less completely. * * * If, through fear of poisoning too weak an application is employed, the most certain way is adopted of accomplishing what it is desired to avoid." Our arsenical preparations should, therefore, be at least one-sixth arsenic. The nerve paste, as it is commonly used, is one-fifth, arsenic. Come's powder is one-half arsenic.

In answering the first charge I have partly answered the second. Considering the drug to be placed in a root canal where there is no pulp, it might pass through the foramen, and when there, would, of course, act upon the adjacent tissues ; but if there is any portion of living pulp in the canal, and that is the only condition requiring its use, then it is effectually prevented from passing through, unless, in very unskilful hands, it is forced through.

The idea of danger being now set aside, we again ask: How long shall the first arsenical application remain in position to produce the best results? It is possible that the arsenic has spent itself in twenty-four hours, but my success seems greater when I prescribe a longer time. Whether that is due to a continued action of the drug, or is simply the effect of time, I am still in doubt, but evidence seems to show that the arsenic does not lose its efficacy at once. It is likely that the breaking down of tissue permits the action of particles not already satisfied. Be that as it may, my practice is to leave the arsenic in position from one day to four *weeks*, according to the convenience of the patient, and the size, age, and temperament of the pulp, *governed, of course, by the considerations previously mentioned in this paper.* Expecting, it the latter time is allowed, that the pulp will have sloughed, and that it can be removed at the next sitting. Preferably, however, if my patient is entirely under my control, and I can be certain of the security of the application, I would allow one week to elapse before attempting any removal of pulp substance. If security of application is an uncertainty, and it is quite often so in proximal cavities, I would make a *preliminary* application for twenty-four hours, to enable me to remove sufficient debris, or pulp, if need be, to make the cavity retaining, and then allow nearly a week to intervene before the next sitting, when I would prepare the cavity, and cut out the bulbous portion of the pulp with a rose bur in the engine, touching lightly, however, that the pressure, might not be communicated through the dead portion of that which was capable of giving pain. At this stage the pulp *may* be entirely dead, but my experience is, that such is not often the case, and I would deprecate any attempt at extirpation unless further time was impossible, or evidence of sloughing was conclusive. It is these premature attempts to remove pulps that have given our patients such a horror of this operation.

And now, the bulbous portion being removed, shall we make a second application of arsenic? In many cases it is best not. The pulp will slough off anyhow. But we cannot foresee this result, and knowing that these fragments are sometimes very tenacious of life, it is better to make another application at once. And here again I should use the dry arsenic. Tannin in combination has been recommended, on the ground that it hardens the fibrils, and renders them easy of removal. I do not consider hardness an advantage, and would much prefer that the remaining tissue would disintegrate, as it can then be easily wiped out with cotton on a broach. The erroneous belief that tissue devitalized by arsenic would not disintegrate, has been held. While arsenic is one of the most potent preservers of dead animal tissue, that which it destroys does not differ in this respect from that destroyed by any other escharotic.

How long, now, shall this second application remain? It is impossible to say just when the sloughing will occur—the conditions of age, temperament, vitality, etc., are so different. Young pulps are more easily affected than those that are older. The lower the patient stands in the scale of temperaments, the less vitality there is in these fragments, or fibrils, and the sooner they are thrown off.

Here the operator must use his judgment, but I see no reason why the application may not remain *in situ* until sloughing has taken place. There is now no difficulty whatever as to its retention, and the quantity can be even smaller than before. And now I would recommend moistening a fine instrument—dipping it into the dry powder, and thus carrying it directly into the root canals. In inaccessible cavities this is impossible, and resort must be again had to the pellet of cotton, unless it is determined to make an accessible entrance to the pulp cavity, which is by far the best plan. The cavity proper can then be filled at once, and further operations conducted through the artificial opening.

I should not expect sloughing to take place in the average case in less than three weeks from date of first application, and should make an appointment at that time, or as nearly as might be convenient. In the majority of cases, extirpation can now be performed painlessly. If this cannot be done, and manipulation causes suffering, more time is required, and possibly more arsenic, although this is very rarely necessary where the drug has been kept in position the time specified. I usually fill the canals with carbolic acid, and the cavity with loose cotton, permitting the patient to change it when desired, postponing the operation for such time as may seem best, but counting rather in weeks than in days, for nature always works slowly. In diagnosing, life still existing in the root filaments, we must be on our guard against deception by spurious pulp pains. This is caused by pressing the dead pulp, debris, or anything that is in the canal, against the unhealed continuation of the nerve exterior in the apex of the root. To differentiate, use a very fine probe—the finer the better—with a sharp point, and introduce it slowly and carefully along the side of the canal. If the pulp is dead, it will go to the apex without producing pain.

Tapping, as a means of ascertaining the condition of the periosteum, is delusive when a tooth has been under arsenical treatment. All dying pulps give pain upon tapping the tooth. So do those undergoing the later inflammatory stages. A symptom due most likely from periostitis from continuity, It is nothing of moment, and needs no treatment. One noticeable point about this symptom in devitalizing is, that is occurs only at the last stages—may it not be in a measure indicative of sloughing.

I have now only to say a few words about partly formed and temporary teeth. The above practice must be considerably modified in both cases. The same conditions exist in both of these classes of teeth, namely, enlarged apical foramen. We must be on our guard, therefore, against greater ease of forcing the medicament through.

The rule to save all pulps alive, whenever possible is never so pertinent as in the treatment of these teeth, because in permanent teeth partly formed, further growth ceases on death of pulp, that being pulp function. The root of pulpless temporary teeth cannot be absorbed, and may create disfigurement.

It is not necessary to allow so much time in these cases for arsenical action. In temporary teeth, twenty-four hours is long enough, and one application likely to be sufficient. For young children, I would prefer to use frequent applications of carbolic acid and tincture of iron.—*Southern Dental Journal.*

IS DECAY OF THE TEETH AN INFLAMMATORY OR A CHEMICAL ACTION?*

By W. Xavier Sudduth. M.D., D.D.S., Philadelphia, Pa., Director of the Physiological and Pathological Lab. in the Medico-Chirurgical College and Demonstrator of Histology in the Philadelphia Dental College.

Mr. President and Gentlemen: Dr. Abbott has reiterated in your hearing to-night the same sentiment which he has previously published, viz.,—that decay of teeth, while differing slightly from caries of bone, is essentially a similar process. He finds in decay of teeth the analogue of osteitis. He further says that "the idea of doubting the existence of the fibrils is too preposterous to talk about." And again, both Drs. Abbott and Heitzmann say that by the technique which we use to demonstrate micro-organisms we destroy the bioplasm bodies. I shall confine myself this evening to these three propositions, and that we may correctly discuss Dr. Abbott's position, I take the liberty of quoting from a paper published by him in the Dental Cosmos, on "Caries of Human Teeth."

"Caries of a living tooth, therefore, is an inflammatory process which, beginning as a chemical process, in turn reduces the tissues of the tooth into embryonic or medullary elements, evidently the same as during the developement of the tooth have shared in its formation ; and its development and intensity are in direct proportion to the amount of living matter which they contain, as compared with other tissues."

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* Read before the First District Dental Society of the State of New York. at its Seventeenth Anniversary, December 9, 1885.

Your attention is first called to the question, Is decay of the teeth an inflammatory action ? I use the term "decay" advisedly, because the process of decay is so unlike that of caries of bone that the same word should not be used to designate the two pathological conditions. It has come to be a generally accepted fact that decay of teeth is a separate and distinct process, As such, it should be so acknowledged.

Caries of bone, as is well known, is an inflammatory action. Decay ef teeth, in so far as the crowns are concerned, is a chemical action: the inflammatory concomitant is a secondary element. In caries of bone the disease begins in the organic substance, while in decay of the teeth the inorganic material is first te be affected. In caries of bone the process is vito-chemical. In decay of teeth the order is reversed, and we see a chemico-vital action.

As regards the erosion of the cement and the dentine of the roots of living teeth, when it does occur, I do not think there is any reasonable doubt but that the process is analogous to absorption of bone, and follows the same order. In caries of bone osteoclasts, or giant cells, are an essential element in the carious process. These cells are probably developed from the white blood-corpuscles which have escaped from the capillary vessels. The nourishment of these cells depends upon the close proximity of a vascular supply. In decay of the teeth all these essentials are entirely wanting. Inflammatory *caries* on enamel or dentine is an utter impossibility when considered from the above standpoint.

Let us see if we can substantiate our position.

The initial lesion in inflammation of bone and cement begins in the vascular system. It may arise from traumatic injury or from an extension of disease from previously affected tissue. An example of the first may be found in cases of fracture ; of the second, in constitutional syphilis and tuberculosis. At first we notice a hyperæmic condition, which is quickly followed by one of congestion, in which there is an exudation of white-corpuscles. The exudation may be resorbed and the equilibrium of the circulation restored. On the other hand, the irritant may be so great, and the existing lesion of such a grave nature, that the character of the exudation may be changed into a purulent condition. In this case the recuperative power of the tissue is entirely overcome and necrosis results. There is an intermediate stage, however, in which the inflammation, once established, is more persistent but less virulent in character. This is designated caries, and a description of this process particularly interests us now, in that we may compare it with decay of the teeth and note the points of dissimilarity.

Dr. Heitzmann holds that erosion is produced by a pathological condition of the fluids of the blood, which liquifies the bone, thus freeing the bone cells, which then coalesce and form the giant cells. He does not satisfactorily account for the presence of giant cells in connection with the absorption of sequestra and other hard tissues in which no living cells exist. Any fluid which has the power of decalcifying bone or teeth, circulating in the vascular system, would have a deleterious action on other parts of the body. I hold that erosion is produced by the osteoclasts at the point of irritation.

Absorption of tissues is a process which is established by nature for the removal of offending particles, or tissues that have performed their life-work, and is therefore physiological, although the process is excited by pathological means. There is set up in the infected part a condition of over-nutrition, caused by the local irritant. The exuded cells tend to form granulation tissue ; rapid cell-manipulation occurs, and numerous cells are found that contain more than one nucleus. These are termed giant cells, or osteoclasts, if the body to be removed is bone. Giant cells are found in diseases where great cellular activity exists ; for example, in miliary tuberculosis, syphilis, sarcoma, hyperplastic granulation tissue, and in connection with absorption of bone and other bodies which *nature* wishes to remove. They are developed in all such places, unless the exuded cells are destroyed and a purulent condition produced.

Flemming has established beyond dispute that cell division is by nucleus division. In some instances, however, the nucleus divides and the subsequent cell division does not follow, in which case "giant cells" are formed. We do not know positively just why cellular activity occurs. It is highly probable that the cells are stimulated to increased assimilation of cell-pabulum, since we do not always find giant cells in all cases of over-nutrition, but the fact of the appearance of giant cells in absorption of tissue, whether the tissue contains bone cells or not, pretty clearly establishes the fact that giant cells have an identity entirely independent of bone cells. Then, again, the giant cells or osteoclasts present a similar appearance to giant cells found—as before mentioned—in syphilitic gummata and miliary tubercles. Zeigler uses the terms "osteoclasts," "giant cells," and "resorption cells" as synonymous when speaking of erosion of bone, and says most emphatically that they arise from the exuded blood cells. Exudation *precedes* the formation of giant cells. Giant cells *precede* the decalcification of bone. The bone cells are the last tissues to be liberated in the process of caries; hence they cannot, with any degree of reason, be said to form the resorption cells, giant cells, or osteoclasts.

A discription of the process, from Woodhead's "Pathology," will further elucidate the point to which I have reference:

"If the caries is situated in the shaft of a long bone, or in the spongy bone of the alveolar process of the jaw, the trabeculæ will be found dilated and the vascularity of the tissue greatly increased. In a picro-carmine preparation of a malignant epulic growth we see lying on the trabeculæ numerous deeply-stained, rounded cells, which appear to be partially imbedded in a layer of pink tissue. The Haversian canals are much enlarged, and at the same time are very irregular; the irregularity being due to a process of excavation extending from the main cavity down into the bone of the surrounding Haversian system. These cavities, whether shallow or of considerable depth, usually contain a number of small round cells (exuded cells or granulation tissue); but in addition, when the excavation is rapidly progressing, numerous osteoclasts, which lie in cup-shaped cavities, or depressions, are seen. The cup-shaped depressions appear to be invariably associated wtth absorption of bone, and are spoken of as Howship's lacunæ. The osteoclasts may be very large, may contain many nuclei, and are, in all respects, similar to the giant cells in myeloid sarcoma. The cells and spaces are much more numerous than they are in normal bone, where they are also associated with a certain amount of absorption."

The roots of temporary teeth are an excellent example of physiological absorption through the agency of the giant cells, but those roots are situated in the jaw, surrounded by highly vascular tissue, which latter is absolutely essential to a carious process. In decay of the crowns of teeth these latter essentials are entirely absent, and the development of osteoclasts or "bioplasm bodies" is an utter impossibility. The ability of the blood-vessels of the pulp to furnish the cellular elements for the production of giant cells is not denied, but if giant cells were produced we should have internal caries. Even granting that the erosion of hard substances is produced by the action of a fluid which exudes from the blood-vessels of the pulp, such erosion would result at the point where the dentine first came in contact with such fluid, so that the latter theory will not apply to decay of the teeth, nor will it hold good in caries of bone. To the giant cells or osteoclasts is attributed the secretion of a fluid which the power of liquefying bone,—they themselves sinking into the cavities which they form. It matters not whether the offending tissue be living or dead, if it is soluble. The process is slower when the tissue is dead. The lime-salts are removed in advance of the organic portions in resorption of living bone. Erosion may begin on the outer side and extend inward; it may commence in the medullary cavity and proceed outward; or both may occur at the same time. "A dead piece of bone inserted under the skin ef an animal, and examined a few weeks after, will be found interpenetrated with vascular granulations, and the trabeculæ will be beset in many places with giant cells. The whole process is very similar to that of physiological bone-resorption. * * * This process is peculiarly modified when the foreign substance is firmly connected with the surrounding tissue ; when it is in fact a necrosed fragment of the tissue itself, such as bone or kidney. In this case the first step is the separation of the living from the dead. Langhaus was the first to describe minutely the process by which larger foreign bodies are absorbed. He pursued the subject experimentally by producing extravasations of blood in various animals. He thus discovered the 'giant cell.' Heihenhain also found them in pieces of elder-pith which he had inserted in the abdominal cavity of animals. Zeigler always met with them in connection with his experiments in placing cover-glasses slightly separated under the skin of a dog. Later experiments with sponge-grafting have demonstrated their presence and active agency in the absorption of pieces of sponge."*

In some instances of absorption of bone, in close proximity to the osteoclasts may be seen osteoblasts building new bone. It is by this after process that bones once formed are enlarged. The osteoblasts on the outer side are adding to the circumference, while the osteoclasts are enlarging the medullary or narrow cavity. The development of the antrum of Highmore may be cited as another example.

No one would think of attributing this action to a pathological condition, yet the absorption is accomplished by the same agency that operates in the removal of bone in caries. It is an undisputed fact that cells have the power of secreting acid fluids to subserve the purposes of nature, and in claiming this function for giant cells we do not go beyond the domain of physiological action. The process of absorption is a purely physiological one, in so far as the removal of the tissue is concerned. The *irritant*, however, that exercises the cells to the secretion of the fluid is without doubt physiological ; but the action of the cells thus stimulated is physiological. To admit that absorption is accomplished by a pathological fluid supplied directly by the blood vessels, would be to admit that the process of development depended upon a highly abnormal condition of the fluid of the blood, and that a well known physiological condition is pathological. There can be no doubt that cellular activity may be induced by different agents ; but no matter what agent incites the progress, the result is always the same, provided the other conditions remain the same.

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* Zeigler's "Pathology."

Nature works through well-known channels to accomplish her ends, and resorption of tissues is one of her many processes. When pathological ends are arrived at, the initial irritant is pathological. In caries of bone it may arise from constitutional disease, such as miliary tuberculosis, in which disease it has been pretty conclusively shown that the irritant is the tubercle bacillus. In caries accompanying syphilis it has not been proven what the initial vice is, but late discoveries point to a micro-organism. Suffice it to say, in general, that in every case when pathological results are obtained cellular activities arises from some irritant having a local expression at the point where the caries is produced,—in which case the caries is the indirect result and not the direct result. I cannot look upon it in any other light than that the specific vice of syphilis and tuberculosis acts as the local cause of irritation. It is the old story of circumlocution and removal of a foreign body,—a ball in the flesh, or a sequestrum of bone, etc. The presence of the irritant gives rise to a perversion of the equilibrium of the circulation, and the localization of the congestion in the immediate neighbourhood of the cause of irritation. This increased flow of nutrition is not in itself sufficient to account for the increased cellular activity, both as regards cell multiplication and function ; for we have congestion many times without the formation of giant cells or the production of acid secretions. No ; there is back of all that can be observed some innate principle, which lies in the cells themselves, that leads to these special attributes,—the " ego " in cell itself, if you please, which turns the local irritant into a cellular stimulant.

Inflammation of dentine may result from traumatic injury, fracture, abrasion, or decay. We will not speak of pericementitis which may extend to the dentine of the root ; it differs in no manner from extension of periostitis, the pericementum being the counterpart of the periosteum.

We will confine ourselves to that portion of the tooth situated above the gums ; claiming that the conditions in the decay of that part are entirely different from those in the root. In caries of the bone the initial lesion is an inflammatory process, in which inflammation precedes erosion of the osseous structure. Now, on the other hand, in the decay of the teeth the order is reversed, and erosion antedates the subsequent inflammation. As we have seen caries of bone depends upon a highly organisee and vascular condition of the surrounding tissue ; in fact, a typical inflammation is always dependent upon such conditions. Now, the inflammatory process seen in conection with dentine is of a very low grade, because of the small amount of organic tissue found in dentine. Mind, I do not speak of inflammation of the pulp, but of the dentine itself. As regards inflamation of enamel, *I have nothing to say, since to my knowledge none exists.* And right here comes in a marked difference between those who look upon decay as a vito-chemical action and those who hold that the process is just the reverse, viz., chemico-vital. Those who hold to the inflammatory view of decay claim that there is a direct calcification of the organic or cellular tissues in the development of the dentine and enamel. I think that I have offered conclusive argument to the contrary in the pages of the *Dental Cosmos*, and so will not inflict them upon you here, but refer you to the November and December numbers for 1884.

That Drs. Heitzmann and Abbott hold the theory that inflammatory processes depend upon a large per cent. of organic tissue is evidenced by the fact that they have to formulate a theory of development that will fit such preconceived ideas of decay. They should have built their teeth first, and afterwards torn them down.

A man once started on a wrong theory naturally seeks to bend every appearance in support of the position he has taken and prove its correctness. Thus it is that so many erroneous conclusions are reached by those who reason from preconceived ideas. Dr. Abbott claims that he has seen a *fine* network of reticular substance left after decalcifying enamel. Now, I have tried faithfully to preserve and demonstrate this "reticulum." I have taken teeth fresh from the mouth and put them directly into Müller's fluid, handling them with as much care as I would nerve-tissues. After several days I ground sections, not allowing the tooth to dry. After grinding I placed them in alcohol to remove the acid, and then stained them with the best technique known. I failed to discover any "reticulum." Again I have taken sections thus prepared and decalcified them under a covered-glass on a slide on the stage of a microscope, carefully watching the process from time to time. *Results negative.* The fluid used was one-half one per cent solution chromic acid.

Again, to avoid all possibility of error in technique, I imbedded sections of freshly-ground teeth in celloidin, and decalcified them in a one-half of one per cent. solution of chromic acid, stained and afterwards examined them with a Zeiss one-twelfth hom. oil im. lens, without being able to demonstrate any organic tissue. By the last-named process it was not possible for the reticulum to disappear through faulty technique. The celloidin, acting as a perfect imbedding mass, was not affected by the acid in the least degree; nor did it hinder in the process of staining, for it is well known that it is more permeable to stain than tissue itself. Further, previous to decalcifying the section, I placed it on a slide, and drew on the reverse side of the slide, with a writing-diamond, the outline of the section. This I used to compare the former outline of the enamel with, by placing the section on it to study. I could thus tell exactly where the reticulum should appear. I did not allow the enamel to be entirely eroded with acid. The line of demarkation where the decalcifying process stoped was well defined, and no appearance of organized or reticular tissue was to be seen between that portion of the enamel and the line drawn on the back of the slide which marked the periphery of the enamel before decalcification. On the strength of these and numerous other experiments, made in decalcifying enamel, both in mature and developing enamel, I drew the existence of such a reticular substance.

(*To be concluded.*)

Correspondence.

To the Editor of the British Journal of Dental Science.

Sir,—The article in your last issue, by Mr. Coleman, F.C.S., treating upon the different results brought about by the administration of liquid and home made nitrous oxide, requires a more extended confirmation to shew wherein the difference can be bronght about.

As every dental practitioner knows that nitrous oxide N_2O is prepared from nitrate of ammonia, many are not aware that nitric oxide N.O is generated from the same salt when over heated, which is more than likely to happen when 'a sharp boy' is in attendance.

In the manufacture of liquid gas, pure nitrate of ammonia is used, and it cannot be contaminated with nitric oxide, as this poisonous gas has not as yet been seen in the liquid form, and does not condense to a liquid, at temperatures and pressures at which nitrous oxide readily liquifies. Therefore liquid nitrous oxide is nitrous oxide pure and simple. There are no different qualities.

I remain yours truly,

ALEXANDER JAMIESON, F.C.S.

Dental News.

ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.

The Annual Meeting of this Society was held at 30 Chambers Street, Edinburgh, on the 12th of March, Mr. W. Bowman Macleod, L.D.S. Edin., President, in the chair.

The Treasurer, Mr. Malcolm Macgregor, reported an income of £29 13s. 6d. derived from subscriptions, entry-money, and the interest on the bank account. This, with a balance of £10 14s. 8½d. carried forward from the previous year, and a deposit receipt of £95, made a sum total of £135 8s. 2½d. After the deduction of expenses, a balance of £2 1s. 0½d. was left, which, with the deposit receipt above referred to, gave £97 1s. 0½d. as representing the total funds of the Society.

On the motion of Mr. Campbell, seconded by Mr. Shiach, the present office-bearers of the Society were re-elected for the ensuing year.

The President then called upon Mr. Cormack for his paper upon "The Mucous Membrane of the Mouth." (see page 486)

STUDENTS' SOCIETY OF THE NATIONAL DENTAL HOSPITAL.

ORDINARY MEETING, MAY 7th, 1886.

Willoughby Weiss, Esq., L.D.S., President, in the Chair.

The minutes of the previous meeting were read and confirmed.

Mr. Phillips showed an old german silver case that had been made and worn about 30 years ago.

Mr. Fripp mentioned a case where a small portion of a root had been left in the lower jaw when the tooth was removed the gum grew over it and the patient suffered neuralgic pains for some years. Mr. Fripp injected cocaine and was thus enabled to cut down on the portion of the root and remove it. Since then the patient has been quite free from pain.

Mr. F. C. Wright mentioned a very similar case.

Mr. Rymer spoke of a case of a severe disturbance in the mouth owing to the presence of a large amalgam filling in a lower molar, producing symptoms of epithelioma or other malignant disease. On removal of the tooth the symptoms disappeared.

The President then called upon Mr. W. J. Fisk to read his paper on "The Reform of Dental Appointments in Provincial Public Institutions." A prolonged discussion followed, in which the President, Messrs. Gaddes, Fripp, Wright, Rymer, &c., took part.

At the close of the discussion Mr. Fisk replied.

After a vote of thanks had been accorded to Messrs. Phillips, Fripp, Wright and Rymer for their casual communications, and to Mr. Fisk for his paper, the President announced that the next meeting would take place on June 4th and the proceedings terminated.

OBITUARY NOTICE OF THE LATE JOHN JAMIESON.

One of the most widely-known names in connection with dentistry is the subject of this notice. It is with regret that we chronicle Mr. Jamieson's death which took place on the 30th of April at Glasgow. He had attained the ripe age of eighty years. Mr. Jamieson was born at Glasgow, October 5th, 1806, when, after passing through the ordinary school curriculum, he became apprenticed to a silversmith. However, he did not continue this branch of industry for any length of time. The early portion of Jamieson's life was spent far away from his native Glasgow, in Gibraltar, and for a considerable time in the West Indies. Although we possess little detail of his experiences and labours during these years, yet those who knew Mr. Jamieson will, from their recollection of his many anecdotes of life by field and flood, be able to fill in the gaps left in the record of his early manhood. Jamieson, however, got tired of wandering, and at length decided to join his energies to those of his brother Walter Jamieson, who had, some twenty years previously, established a dental business in Glasgow. It is difficult for the younger members of the profession to realise that at that time bone work and even natural teeth were all the vogue. Yet, so it was ; and it was mainly owing to the exertions of Mr. Jamieson that some improvement in this line was effected. It was the brothers, who we learn were the first to introduce the teeth of S. W. Stockton, and those of the late Dr. S. S. White. It was Dr. White who, speaking of the subject of our memoir, styled him " the pioneer of the introduction of American dental materials in Great Britain." The firm continued to bring before the profession in the United Kingdom all the best forms of American work, and were, in many cases, sole agents.

And now we are compelled to close our brief notice. After leading a life useful alike to his immediate surroundings, Jamieson died respected and esteemed by a large section of the profession who had come into contact with him, and beloved by his home circle—a man who had passed through a long life successfully and who left behind him a name much esteemed and honored.

APPOINTMENT.

R. Denison Pedley, L.D.S., M.R.C.S., Dental Surgeon to the Evelina Hospital, Southwark Bridge Road.

Mr. Hern has been elected Assistant Dental Surgeon to the Middlesex Hospital.

At the April Sittings of the Examiners the following candidates were admitted licenciates in dental surgery :—Matthew H. Nisbet, Glasgow ; John Spotswood and Fred Dale, Sheffield.

British Journal of Dental Science.

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PYORRHŒA ALVEOLARIS.—SPONGE-GRAFTING AS RELATED THERETO.*

By W. H. Atkinson.

True diagnosis is the first prerequisite. There can be no real pyorrhœa alveolaris without loss of attachment of the dentium ligamentum, superficially or deep into the socket. Flow of pus is always evidence of failure of first effort of the system to produce new tissue to take the place of that which has been lost through traumatism or mal-nutrition, singly or in combination. Pyorrhœa is cured by destroying the microbes which prevent the formation of new tissue by first intention,—regular granulation as it is called. That arising from mal-nutrition is cured by rectification of the constitutional and local conditions which precede and accompany the diseased acts.

Imperfect elimination of urea is the principal constitutional antecedent of pyorrhea. This form is only palliated by local treatment.

Traumatic pyorrhœa is resultant upon the presence of foreign bodies in the alveoli, such as bones, splinters of wood, or misplaced teeth, or parts of fractured teeth and bones; and is cured by removing the foreign body and securing a sterilized pocket for the new growth.

Calcareous deposits are never the cause of pyorrhœa, and but seldom even concomitant with the malady properly so classified. Nevertheless they should be removed and prevented from re-forming by proper cleanliness.

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* Read before the American Dental Association, and reported in the *Transactions*.

Pus, sanies, and ichor are products of microzymes capable of destroying the pabulum brought to the seat of lesion for repair. Many parasiticides are capable of destroying these microbes.

Escharotics not only destroy the bacteria, but also convert the pabulum and soft tissues into a sort of scab of "cooked flesh," of a density commensurate with the strength of affinity between the remedy and the protogenous mass, with which it combines by what has been called chemical affinity. Wherever this pellicle is insoluble in the solution which produces it, the production of microbes from the outside is prevented, and the scab now supplies the "sterilized pocket"—"utricle"—in which normal tissue of the part will form.

Nitrate of silver has long been known as able to afford this kind of protection of granulating surfaces by supplying the outer wall of the "utricle"—"pocket." In good constitutions non-sterilized pockets may continue to discharge those products of the killed papulum,—pus, sanies, ichor,—for indefinite length of time, often during life of the subject.

For constitutional treatment, correct gymnastic exercise, tonics, and alteratives are to be resorted to, viz., exercise just short of fatigue, bathing, and regular rest in sleep of eight hours per day ; as a tonic, sulphate of cinchonidia, four to six grains per day in two or three doses of two grains each persisted in until the blood column is in full supply of cruorin (hæmoglobin).

For local treatment, three principal remedies are preferred, viz. : elixir vitriol (full strength), aqua regia (one part to seven of distilled water), and a caustic paste made of crystallized carbolic acid and caustic potash rubbed into a paste of equal quantities in a glass or wedgwood mortar, *without water*. This last is now known as the "Robinson Remedy," when made with water. These remedies, with many others, are capable of meeting our necessity in these cases.

The great obstacle to correct practice among all sorts of healers is the lack of knowledge of the principles of molecular changes and the manner of their presentment in health and disease.

The principal incitement to write papers on professional topics is to so state the facts of diagnosis and application of remedies that have led me safely as to enable others to profit by my experience. The stages of loss of the attachments of the teeth to their sockets will be met by the use of the remedies in the order here named, viz.:

Where slight recession is present and little or no discharge perceptible, use elixir vitriol in the little recesses; where the loss of attachment is greater, and accumulations of food, microbes, soft or even hard lime-deposits occupy the recesses, use aqua regia; where the loss is greater still and the gums dark, swollen, and discharging pus, sloughs, and bloody serum, then resort to caustic paste, being nice and careful about seeing that it touches only the depth of the pockets and their margins without flowing over on to the membrane, and especially the lining of the cheeks and lips.

In the whole history of surgery there is no method of so much value and so little understood and practised as that which has been called sponge-grafting. Like most of the knowledge of principles and modes of practice in our specialty, it grew out of the misfortunes of traumatic or functional lesion. The first use made of sponge-grafting in a crude way was by obstetricians, to fill the gap of cervical fissure of the uterus resulting from violent and tedious labour. I remember the discussions as to what became of the sponge. In one case, of a very nervous woman, then called hysterical, it was questioned whether she did not purposely remove the sponge, although she stoutly maintained the contrary. The cases submitted to this treatment did so well that the method was kept secret among a few for years. At that time a solution of bichloride of mercury in water, alone, or with sal-ammoniac, was the external remedy used for scabies (the itch). Dr. Wm. Woodruff, of Meadville, Pa., at the suggestion of a pupil then studying with him, wrung out a sponge in this solution and used it in a badly torn cervix uteri following labour, which healed so kindly as to induce him to adopt it in the general treatment of these lesions.

The tediousness of the drainage method of healing large loss of tissue by fibrous tents, rubber tubes, or horse-hair or other setons, so induce granulation, is greatly abridged by the use of a sponge-graft in place of a tent, which tent must be removed before the wound can be closed completely by the new growth.

Efforts to assist nature in healing wounds and in reproduction of lost tissue from traumatic lesion, or from functional lesion, had been so various, bungling, and inhuman, that it is no wonder that a mere expectant course long held dominion in the annals of surgery. From the abhorrent use in surgery of *the actual cautery* in the shape of boiling oil (in which the bleeding stump was plunged) and red-hot iron and embers applied to bleeding wounds, and the *potential cautery* in the shape of the strongest alkalies and acids to arrest hæmorrhage, the " wait and watch " treatment was established. The lack of any just apprehension of the process of inflammation permitted the introduction of " irrigation " and " drainage " of wounds and abscesses as helps to " granulation," as healing of suppurating tissues was then called.

Healing by " first intention " has always been regarded with high favour. Every method and management conducive to this form of healing must be of the highest importance. Transplanting bits of skin and bits of epithelial tissue led to such kindly results as to suggest the introduction of some receptacle in which the blood-plasm might be received and held in place to form a clot in the gap of the wound, to be metamorphosed into the scar-tissue taking the place of the lost substance.

Many forms of animal sutures and of flesh tents were resorted to, especially fibrous tissue in the shape of tendons. At length sterilized tents were introduced, which were gradually extruded as the new formations progressed in the depths of the wound, and had to be cut off, from time to time, until at last a mere shred remained in the pit left at the site of the former wound-tract. Sterilization, now known as " Listerism," is a great step in advance of the old filthy method of uncleanly carelessness.

The accounts of chicken's flesh and other forms of non-human animal flesh being used to fill gaps of lost tissue may be dismissed with the verdict of "not proven." The accounts of the use of sterilized sponge on the other side of the Atlantic led me to try the method in my own practice. The results have been so favourable as to induce me to write this paper, with the hope of having my brethren become partakers of the benefits of the simple and beneficent device.

Take a case where a portion of the flesh has been quite removed by bite of a dog, cut with knife, buzz-saw, or other free-cutting instrument. It is only necessary to staunch the bleeding and fit a bit of sterilized sponge of the size and shape of the lost flesh and cover it with some impervious dressing, of oiled silk, sheet rubber, court plaster, gold-beaters' skin, Husband's plaster, or such like, over which a light support, without pressure, should be secured to keep the exudate of blood-plasm from escaping too freely. When this is done in a healthy subject we may look for union by first intention, without one drop of deteriorated pus or other aberrant product of the albuminoid clot which fills the cavity, and out of which the new growths of tissue come.

Destruction of all disease-germs which adhere to the dressings constitutes the sterilization or Listerism which proves so conducive to healing by first intention. A large number of germicides are at our command, which are competent to effect sterilization. The chief one and leading the list is a solution of bichloride of mercury, of from one in five hundred (1 in 500) to one in a thousand (1 in 1000) parts of distilled water.

Sponge-grafting conserves the time and energy of the healing process. The former manner of determining the point at which to cease dressing was to place the finger upon the new growth. If the plasm broke short without adhering to the finger and forming a more or less tenacious rope, which broke as the finger was carried away further and further, it was deemed necessary to continue stimulating dressings. But if the rugæ of the finger left their imprint upon the jelly-like mass closing the wound, it was deemed better to simply protect it from outward disturbance by a simple non-irritant dressing. If the plasm was so watery as to not rope at all, dressing with some coagulant was advisable.

With the old training to guide us, and the present better understanding of the character and steps of the inflammatory process, we are more able to discriminate the indications of favorable progress and unfavorable regress of the healing processes.

A CASE OF VASCULAR EPULIS GIVING RISE TO CONTINUOUS HÆMORRHAGE, REMOVAL AND RECOVERY.

By PERCY MAY, M.R.C.S., L.D.S. Ed.

A peculiarly interesting case came under my notice a few weeks ago. The patient, a gentleman, about 55 years of age of plethoric habit, presented himself with his mouth full of coagulated blood, which he said had been continually oozing for two or three days, the blood springing from a small "gum-boil" situated upon the lingual margin of the alveolus of the second upper bicuspid.

The patient did not complain of any pain, whatever, in the tooth or teeth, and stated that he had sustained no blow or accident of any kind in anyway relating to them. When asked how long the growth had been there, he said that he fancied it must have been noticeable "a few months."

Upon syringing out the mouth with cold water and removing all clots, a distinct and fairly rapid oozing could be detected from the growth, which I put down as an unusually vascular Epulis.

After well rubbing the growth with Argent. Nit:, I plugged between it and the neck of the second bicuspid (which was slightly loose), and also between that tooth and the first molar. I requested the patient to keep as quiet as possible, to suck ice, and take nothing but spoon diet. He paid me a visit next day, when all hæmorrhage had ceased.

Three days afterwards I removed the second bicuspid, which I considered to be the cause of the growth, plugged the socket, and rubbed the swelling with Argent. Nit. I prescribed rest, &c., as before. Upon visiting me the next day all bleeding had ceased, and the growth certainly diminished in size. If it did not entirely disappear, he was to pay me another visit, which he has not done yet, (3 weeks since.)

The root of the tooth was much absorbed, and in places, roughened from slight cemental deposits. The state of the pulp I could not see, as the patient took the tooth.

THE MUCOUS MEMBRANE OF THE MOUTH,

WITH SPECIAL REFERENCE TO ITS PHYSIOLOGY AND PATHOLOGY, AND THE PART PLAYED BY ITS SECRETIONS IN THE PRODUCTION OF DENTAL CARIES.*

By Edwin A. Cormack, L.R.C.P. & S., L.D.S. Edin.

(*Continued from page 490.*)

Simple catarrhal inflammation frequently occurs during the period of dentition, when it is often accompanied by fever.

Erysipelatous inflammation may extend from the skin to the mouth, or may begin in the mouth, caused by the direct action of irritant bodies, as by scalding drinks, acrid or corrosive substances taken into the mouth. It is characterised by livid redness and much swelling, and sometimes even vesiculation. The tongue is the part most affected.

Aphthous Stomatitis is distinguished by the appearance on the catarrhal mucous membrane of small whitish or slightly yellowish patches (aphthæ) varying from the size of a millet seed to that of a pea.

They are surrounded by a livid border and may coalesce into larger patches. These aphthæ consist of a solid exudation lying between the fibrous tissue and the epithelium—(Böhn). The exudation may be re-absorbed and the aphthæ then disappear, or the epithelial covering may be broken through, the fibrinous film exposed, and gradually separated by the epithelium advancing beneath it from the margin.

As the epithelium is reproduced simultaneously with the separation of the fibrin, no ulcers are in general produced. The eruption occurs in successive crops, and may thus be kept up for weeks.

It occurs chiefly in children who are teething. It also occurs in connection with sore throat, pneumonia, gastric catarrh, the acute exanthemata, diphtheria, ague, whooping-cough.

This affection has no connection with any invasion of fungi.

Ulcerative Stomatitis is an affection which always starts from the alveolar margin of the gums—(Böhn). It begins with redness, swelling, and loosening of the gums around the teeth. The alveolar border becomes rounded and swollen, with blunt processes rising up between the teeth. Hæmorrhage is not uncommon at this stage. In the second stage the margin of the swollen gum becomes discoloured, and the tissue softens and breaks down into a yellowish friable mass—ulcers are thus formed, which rapidly deepen. The ulcerative process may extend directly to the contiguous parts of the cheek and gums, and may work downwards till it attacks the periosteum of the bony structures, leading to necrosis.

The affection is usually acute—children are especially liable to it. It attacks people who are badly nourished or debilitated by disease, such as scrofulous disorders, intestinal complaints, typhoid fever, diabetes, or scurvy ; damp, cold or impure air favours its appearance.

Local irritations may lead to it, as in cases of chronic poisoning by mercury, phosphorus, lead or copper. The form, which is due to long continued phosphorus poisoning, is apt to extend deeply into the tissues, and so to give rise to periostitis and necrosis of the bones.

Noma or cancrum oris is an allied but more severe disease. It may begin as an ulcerative disease, or appear independently. In the former, the disintegration of the tissue of the gums extends rapidly, and the tissue breaks down into a pulpy gangrenous mass.

In the latter, the first symptom is the appearance of a livid swelling on the inner surface of the cheek, near the angle of the mouth, accompanied by the free flow of foul saliva ; a patch of greyish yellow infiltration then appears, and this speedily breaks down and becomes gangrenous.

As the disease progresses, a purplish spot appears on the outside of the cheek, this becomes black, and gangrene sets in and spreads. It is generally confined to one side. Once the gangrene has commenced, it may spread to a considerable extent, advancing very rapidly : noma is generally fatal. It attacks poor and debilitated children, usually between the ages of ten and twelve.

Suppurative inflammation of the mucous membrane of the mouth and partly underlying it should be distinguished from ulcerative stomatitis and noma. It may affect any part, but appears most commonly in the tongue and gums. In the latter, it frequently arises in connection with carious teeth. The gum becomes red and swollen, and, presently, pus forms beneath the surface. This is termed a gumboil.

Croupous Stomatitis.—When the mucous membrane is so injured that its epithelium is destroyed here and there, and its blood-vessels so much injured as to allow of free exudation of their contents, coagulation of the latter may take place. This forms a false membrane, consisting of fibrinous filaments and granules, beset with pus cells or of shining homogeneous blocks representing cells that have undergone coagulative necrosis.

The false membrane is connected with the underlying structures by fibrinous filaments ; but can be readily pulled off, showing the reddened surface of the mucous membrane beneath. To produce coagulation, the exudation must be of an inflammatory nature and the cells necrotic.

Diphtheritic Stomatitis.—When a mucous membrane is injured in such a way that its epithelium dies without desquamation, while its blood-vessels are damaged and pour out an abundant exudation, it sometimes happens that the dead epithelial cells become saturated with the exuded liquid, and they then pass into a peculiar condition of rigidity resembling coagulation.

The seat of this change appears as a dull greyish raised patch, surrounded by red swollen mucous membrane. The exudation is rich in albumen, and the cells take the form of a kind of coarse network. The sub-epithelial asteolar tissue is beset with filaments of fibrin and leucocytes. Hæmorrhages are not uncommon.

Inflammations of this kind, in which the tissue itself coagulates into a solid mass, are called diphtheritic : and when the necrosis and coagulation extend only to the epithelium the affection is called superficial diphtheritis. Inasmuch, then, as the croupus membrane consists essentially of coagulated exudation, croupous inflammation is at once to be distinguished from superficial diphtheritis, in which the epithelium coagulates *en masse.*

Deep or parenchymatous diphtheritis is charactised by the coagulation not merely of the epithelium but also of the underlying connective tissue.

Wedl states that this affection gives rise to a general inflammation of the root membranes over the whole row of teeth in the upper or lower jaws.

"Croupous inflammation of the gum is an infection of considerable importance, both on account of its sudden occurrence and also because it is liable to assume a diphtheritic character."

"In the first stage the edge of the gum is covered with a whitish-grey membraniform exudation. . . . The mucous membrane deprived of its epithelium is slightly swollen, tender to the touch, and bleeds easily." Generally the exudation appears on the margin of the lower jaw which faces towards the lips and cheeks, whence it spreads gradually over the whole anterior and posterior edges of the gums. The exudation degenerates very rapidly into an offensive, sanious mass.—(Wedl.)

PARASITIC AFFECTIONS.

The oral cavity is always infested by a multitude of vegetable micro-parasites which gain entrance to it from without, and find in it a fitting soil for their growth.

Moulds, yeasts, and bacteriæ are all met with; of the latter micro-cocci and sarcinæ occur, as well as bacilli and spirilla. Where cleanliness is not observed, they may occasionally set up putrefactive decomposition. Measles, scarlatina, small pox, diphtheria, &c., all give rise to inflammatory conditions of the mouth ; and as we regard these diseases as due to micro-parasites, we must assume that the corresponding pathogenous organisms gain access to the tissues of the mouth.

Saccharomycis albicans—muguet, or thrush fungus—is a special fungus of the mouth, generally referred to as Oïdium albicans. It is one of the yeasts, and is therefore akin to the mycoderma vini (mother of vinegar) or saccharomyces cerevisiæ. The scum which forms on the surface of alcoholic liquors, and leads to their transformation into vinegar, contains this yeast fungus—the mother of vinegar. Yeast cells not only set up fermentation directly, but they yield an unorganised ferment which changes cane sugar into grape sugar.

They have no power of invading living tissue and are of little pathological importance, as it is only under specially favourable conditions they are to grow freely. There is usually no great supply of fermentable saccharine matter available for them. The presence of acids does not check their development. Although probably always present in the mouth, the sub-epithelial tissues are only invaded when by antecedent changes, constitutional or other, the resisting power of the tissues has been considerably diminished. As it occurs in the mouth, it assumes the form of rounded or oral cells, seldom filaments. It gives rise to minute, whitish, slightly raised specks on the mucous membrane. They are generally to be found on the inner surface of lips and over the tongue. As they grow they coalesce into whitish films. After a time the film is cast off, the surface beneath appearing red and sometimes eroded. The fungus grows mainly in the middle layers of the stratified epithelium. From this position the fungus may penetrate into the deeper layers and reach the fibrous structure. Its progress downwards is marked by inflammation.

Thrush is a disease which manifests itself in very young children, and in adults debilitated by exhausting diseases. Its growth is favoured by the use of cows' milk or starchy food, and by imperfect cleansing of the infant's mouth.

HYPERTROPHY AND ATROPHY.

The epithelium of the mouth is constantly being shed and continually renewed by regenerative multiplication. In catarrhal affections this shedding is a prominent feature, and deposits are formed on the surface of the mucous membrane. This deposit is added to by the remains of food and by rapidly growing fungous parasites. In this way a continuous film or fur is produced.

Hyperplasia of the connective tissue is due either to some chronic inflammatory cause or to congenital conditions.

Inflammatory hyperplasia is most commonly met with in connection with the gums. It gives rise to circumscribed tumour-like thickenings.

Atrophy of the gums and of the alveolar parts of the jaws is apt to follow upon the loss of the teeth, and is normally present in old age.

The results, then, of our investigations into diseases of the mucous membrane show that they are for the most part of an inflammable character, caused in some cases by direct action of irritants taken into the mouth, in others by disorders acting initially at more distant parts of the alimentary canal. We have also seen that the characteristic eruptions of the exanthemata make their appearance in the mouth; that a weak habit of body predisposes, and that malnutrition and bad hygiene are important factors in their causation. Parasites also contribute their evil influences.

Inflammation, if slight, increases the secretions; if more severe, it impairs the vitality of the mucous membrane by desquamation of its epithelium and interruption of its functions. It may destroy the epithelial covering, and even the underlying tissues, by infiltration, ulceration, or necrosis.

By infiltration or by hyperplasia it may produce obstruction of the gland ducts, and consequent cysts; or, where the processes are excessive, total obliteration.

(*To be concluded.*)

OPERATIVE DENTISTRY.

By Dr. George H. Cushing of Chicago.*

(Concluded from page 495.)

Another prolific cause of failure is to be found in over-malleting upon the margin. This is probably the cause of more mischief than is generally suspected. The edges of enamel, no matter how well prepared, cannot withstand more than a certain force of impact, and we cannot determine with accuracy just the amount in any given case they are able to sustain. Hence we should exercise the greatest care, and be sure to err on the right side. The tendency to extreme malleting is very strong, and the fact that much more gentle force than is generally used would be equally if not more effective is apparently not at all appreciated. To correct this error would probably be more difficult than might at first appear, from the fact that we cannot easily change our judgment as to the amount of force proper to be used, after a long-established habit which we have felt was justified, and also because of the difficulty of judging *de novo* what amount of force it would be proper to apply. The safest method, doubtless, would be to use hand-pressure over the margins until they are covered with a sufficient bed of gold to enable them to bear the mallet force.

The next cause I shall mention may be found in the improper shaping of the proximal surfaces of teeth where separations are made, either by cutting or grinding, or by wedging. In all such cases, where it is at all practicable to do so, the surfaces should be so shaped that in the event of the teeth approximating closely the gold should come in contact rather than the teeth, and that towards the grinding end of the tooth, so that a free space may be left at the necks of the teeth. In the case of that class of teeth which naturally present large plane surfaces on their proximal sides, they should be cut away on their buccal and palatal aspects, and so filled as to present the same kind of surfaces as above described. Were such teeth wedged apart and filled, and permitted to retain their natural shapes, the chances of failure upon their coming together would be manifold greater than if shaped as indicated as above. This is one of the cases in which to retain or to attempt to perfectly restore the natural contour would be to invite disaster.

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* A paper read before the Illinois State Dental Society and reported in the *Transactions of the Society*.

Finally, one of the great causes of failure is to be found in the attempt to do in an hour that which requires two hours for its proper performance. There is probably no fault so prevalent amongst dentists as this, and it stamps failure upon very many operations that, if given ample time, would not fail. Hasty, slip-shod operations bring reproach upon the profession, destroy the confidence of the patient and the reputation of him who performs them. The only influence that can remedy this evil must come from a higher appreciation of our duty as professional men, and a more conscientious performance of that duty.

The above are among the most potent and continually present cause of failure, and though they have repeatedly been written and talked about, they will continue to require to be impressed upon our minds so long as we are fallible and liable to error.

There are other causes which might claim attention, but they will undoubtedly be brought out in the discussions.

I come now to present some thoughts on the necessity for more thorough and conscientious treatment of pulpless teeth. The articles that have recently appeared in the *Medical Record* on this subject ought to awaken the profession to the importance of its consideration. While some of these articles from medical men exhibited great ignorance of the resources of the dental profession, and their conclusions were entirely unjust and absurd even, yet the facts upon which they were based were sufficiently alarming to arouse us to renewed efforts to secure not only a proper understanding of this matter, but a more conscientious carrying out of the operations necessary to insure success.

The fault is not that the proper treatment of pulpless teeth is not well understood theoretically, for there is no one subject perhaps that has been so thoroughly considered and demonstrated as this ; yet it is very evident from the teaching of daily experience that there must be a criminal carelessness on the part of very many of the profession, who ought thoroughly to understand the subject, and the manner of performing the operations called for in this class of cases. There is hardly a day passes that competent men in the profession do not witness the evidence of this carelessness, in varying manifestations ranging from the incipient soreness upon touch—which precedes extreme inflammation and abscess—to the gravest complications of extensive necrosis. These evidences come not alone from the hands of country dentists or of those not high in repute, but too frequently from the hands of gentlemen holding high positions in the communities in which they live, both with the public and their fellow practitioners. This carelessness doubtless arises largely from the fact that the treatment of these cases demands, many times, more patience and is attended with more annoyances than any others with which we have to deal.

The delay frequently necessary in treatment before the final operations can be completed, becomes to some practitioners exceedingly irksome, and they are tempted to force matters. Again, some patients are very nervous and suffer greatly in having the root-canals of such teeth properly cleared, and here some operators are tempted to try to fill the roots before the proper time, trusting to chance for fortunate results. It is hardly necessary to say that such men are very apt to perform the operation of filling the roots in a slovenly and imperfect manner, and so the foundation is laid for evil consequences to follow, as undoubtedly they do in a large majority of instances, and partially justify the sweeping charges which have been referred to as having appeared in the *Medical Record*.

I said that the proper method of treatment was well understood theoretically. Perhaps I should modify that statement by saying that it has been so thoroughly taught and demonstrated that there is no excuse for any ignorance among respectable practitioners regarding it. And yet there evidently is ignorance where it would not be looked for.

A friend of mine was invited to a gentleman's office to advise him regarding a certain case, and while there he became satisfied that the gentleman did not fully understand the method of filling roots, and offered to show him his method. When he went to his office again for that purpose he had to make all the instruments necessary, for the dentist had not even a broach fit for the purpose, nor any proper instruments for removing the contents of the root-canals. And yet this dentist was professing to treat pulpless teeth scientifically, and to properly fill their root-canals. He was a member of a first-class dental society, and had heard described and seen demonstrated the thorough method of treatment repeatedly, and yet as you see, was utterly ignorant of its practical application. When such men, enjoying all the advantages coming from association with the best men in the profession, commit such stupendous blunders, is it to be wondered at that that much larger class, who have no such advantages, and who do not desire them, should by their continual malpractice furnish seeming justification for the sweeping condemnation by medical men of the practice of retaining in the jaws pulpless teeth ?

It is not my purpose to detail the proper methods of treatment here,—only to insist that thoroughness should characterize every detail of the procedure. The canals should be as thoroughly cleansed as may be ; should be absolutely disinfected, and as perfectly filled as delicate and careful manipulation will render possible. In order to secure this thoroughness, it is necessary that the rubber dam should be applied ; that ample time be given to each step of the operation, and nothing be left to chance where certainty can be attained. In this way alone can we hope to establish a reputation which will in time obliterate the stigma which has been placed upon us by medical men.

In closing, let me say that if by the disjointed and imperfect presentation of the matters I have here attempted to bring before you I shall have succeeded in arousing any to greater earnestness in the endeavour to reach perfection in our art, I shall feel that my effort has not been in vain.

ON SOME RECENT ADDITIONS TO THE MUSEUM OF THE ODONTOLOGICAL SOCIETY.*

By Storer Bennett, F.R.C.S., L.R.C.P. Lond., L.D.S. Eng., Hon. Curator of the Museum.

Mr. President and Gentlemen,

The Museum of this Society has lately been enriched by the addition of numerous specimens of normal and morbid anatomy, both human and comparative, some of them being examples altogether new to the collection. And while our hearty thanks are due to all those who have presented specimens to the Society, one gentleman, Mr. Bland Sutton, is, I think, especially deserving of thanks for his numerous contributions of unique illustrations of many interesting points in comparative dental pathology, which show the disastrous consequenccs that may occur to the lower animals when the subjects of accident or disease.

It has been suggested that if a few of the specimens lately acquired by the Society were exhibited and briefly commented upon, it might prove not uninteresting to the meeting, and that members might be stimulated to acquire an increased number of specimens for presentation to the Society's collection.

In the skull and mandible of a female Dugong (*Hallicore Dugong*) the Society has obtained a most valuable acquisition, for it previously possessed but two incisors (male) and a solitary molar to illustrate the dental armature of this most curious creature.

In this specimen the permanent incisors (the deciduous ones being already shed) scarcely protrude through their bony sockets; they are solid throughout and gradually diminish in thickness from the base to an obtuse rugged point, whereas the male incisors are of the same diameter from base to apex, where they are obliquely bevelled to a sharp edge like the scalpriform incisors of a rodent. The base of the male incisor is hollow and contains the large mass of pulp necessary for the production of this tooth of persistent growth ; the pointed extremity of the tooth projects beyond the jaw, elsewhere it is covered in by solid bone. Not so, however, in the female ; in her the base of the incisor is suddenly enlarged, bent obliquely outward, and presents a shallow excavation. It is remarkable that the wall of the socket over the expanded base of the incisor tooth in the female Dugong is always deficient, presenting a somewhat cribriform appearance and marks a characteristic difference between the sexes.

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*Read before the Odontological Society of Great Britain.

There are no true permanent incisors in the lower jaw in either male or female. Of the twenty molar teeth which is the full complement the creature possesses, the present specimen has but six ; of these, however, the fourth and fifth molars are the most characteristic, and of these we are fortunate in possessing three of each.

The fourth molar is cylindrical in shape, slightly bent, the crown being flat or slightly excavated in the centre. The fifth molar is much larger than any of the others and later in appearance, so that by the time it comes into use some of the anterior molars have become absorbed and extruded from the jaw. No enamel enters into the structure of these teeth, the Dugong's molars consisting only of a central mass of dentine thickly encased by cementum.

Two interesting examples of dental disease occurring in Marsupials are afforded by the lower jaw of a Hypsiprymnus and half the skull and mandible of a Kangaroo.

In the former (Hypsiprymnus) the two lower incisors were broken during life, giving rise to two alveolar abscesses, and leading to such considerabie necrosis that the right premolar (so peculiar and characteristic in this creature) has been destroyed and extruded.

In the kangaroo extensive absorption of the alveolus has taken place, causing loss of the premolar and all the molars in each jaw except the last. The appearance forcibly reminds one of that which is presented by a senile human jaw which has long ago parted with the teeth of its youth.

The skull of a rabbit in which an ununited fracture of the lower jaw, with the formation of a false joint, has taken place, affords a good example of the mischief which may arise in creatures possessing teeth of persistent growth, when from accident their normal antagonism is not maintained. In this specimen the lower incisors are, from want of wear, excessively long, and the left upper incisor pierced the gum of the right lower jaw, causing periostitis and deposit of new bone where the sharp edge of the tooth came in contact. Some of the molars also, from non-approximation, have become excessively long and laterally deflected.

In the skull of a lion affected with rickets we have obtained our first example of the king of the forest; but it is interesting pathologically rather than anatomically, for the bones are so immensely thickened, that although the teeth are very large, nothing like the whole of the crowns appear through the openings in the alveolus, and during life merely the points of the cusps pierced the mucous membrane which itself was enormously thickened. In consequence of the teeth never having been subject to wear, the sharp edges at the back of the incisors and on the margins of the canines are very accurately preserved. The specimen contains in the upper jaw one incisor (the third), the canine and three premolars; the little true molar, is missing. In the lower jaw the true molar, which is of course the carnassial tooth, is preserved.

In the skull and mandible of an African Warthog (*Phacochœrus Æliana*) the Society has acquired another specimen of which no previous example existed in its collection.

Of all the hog tribe no member is more interesting in its dentition than the Phacochærus, for its third true molar is so large and peculiar that it is without rival for its size, compared to the jaw which contains it, in any living mammal with the single exception of the elephant.

This third true molar is laterally compressed, but greatly prolonged in an antero-posterior direction; the grinding surface of the tooth presents three parallel rows of tubercles which are the worn extremities of a number of enamel cylinders surrounding a core of dentine, the whole being fused together by cementum. About eight of these cylinders appear in each row. The tooth is continued of the same size and shape without any differentiation into crown and fang, quite to the base of the jaw, where its formative pulp beïng preserved in an active condition continues to produce new tooth substance in compensation for that which is worn away until an advanced period of the animal's life.

If the third molar of Phacochærus be compared with that of the wild boar, with *Sus babirussa*, or with any other member of the hog tribe, the remarkable development of the tooth in the former creature will be at once apparent.

Additional interest is lent to the present specimen from the fact that an alveolar abscess has developed in the right side of the lower jaw, which has burrowed and pointed on its under surface. The bone is here rough and thickened and cloacæ bear evidence that necrosis has supervened.

The class of Ungulata has lately been enriched by the acquisition of a skull and mandible of a young hippopotamus. The incisors, two in number in each jaw, are but partly erupted, as are also the canines ; in the upper jaw the second, third, and fourth premolars, and the first, second, and third true molars are *in sitü* on the right side ; the first premolar on both sides, and the second and third on the left being already shed ; the fourth true molar on both sides is unerupted.

In the lower jaw the fourth premolar and the first, second, and third true molars are in place, the fourth true molar being still hidden in its bony crypt, while the three anterior premolars have been shed.

The hippopotamus is becoming so scarce that I think the Society is to be congratulated on acquiring so fine a specimen, which will serve as the complement of the adult hippopotamus skull it has so long possessed.

A specimen of the so-called "Riggs' Disease" occurring in a monkey (*Cercopithecus lalandii*) is not only interesting from the evidence it bears that the lower animals as well as man are subject to this affection, but from the circumstance that the disease has attacked chiefly the buccal surface of the molar and premolar teeth in the upper and lower jaw ; the lingual surface of the lower incisors, the position which in the human subject is the commonest for deposits of tartar being here comparatively free.

The last series of preparations to which I wish to draw the attention of the members consists of the crania and lower jaws of two adult Gorillas, and a series of bones of other parts of the Gorilla's skeleton. The skulls have been previously described ; one, however, in addition to its anatomical interest, is also pathologically so from the fact that it bears evidence of previous injury which has caused extensive destruction of bone in the neighbourhood of the orbit, malar region, anterior nares, &c.

The bones of the skeleton have been arranged on a board side by side with their corresponding human ones, and it is very interesting to compare the relative proportions of the upper and lower limb in the two cases. In the gorilla the upper limb is immensely larger than in man, as may be seen by comparing the enormous scapula and extremely long humerus, radius, and ulna of the gorilla with the much smaller human bones. In the lower limb the converse holds; here the human femur, tibia, and fibula are very much longer than those of the gorilla.

The sacrum in the gorilla is longer but narrower than its human prototype. The spinous processes of the vertebræ are in the gorilla remarkably long, and it possesses thirteen ribs and thirteen dorsal vertebræ to support them, instead of only twelve in the human subject.

Reflections from the Surgery.

EXSECTION OF DENTAL NERVE—TWO CASES.*

By B. H. Catching, D.D.S.

Case First.—Dr. H., druggist by occupation ; age about thirty-six years. Two years or more ago he felt the first

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*Reported to the Georgia Dental Society.—(*Southern Dental Journal.*)

pain on the left side of inferior maxilla, located about the molar teeth. After bearing frequently-recurring paroxysms, he consulted a dentist, who extracted one of the molars ; only very slight relief was obtained. After a short time another molar was removed without relief.

More than a year ago, and after twelve months of constant suffering, he called on me for advice. After a thorough examination, no abnormal condition was found either in bone or soft tissues. The remaining molar had an amalgam filling in the posterior approximal surface, which I removed, thinking probably to find a diseased pulp ; the dentine was sensitive, the tooth responding to thermal changes. The cavity was re-filled with gutta-percha ; no improvement was made. I advised the removal of the tooth, as a means towards relief. To this he would not consent, his experience with extraction not having been satisfactory. I diagnosed the case pressure on the dental nerve, and informed him that in all probability an exsection would have to be performed before he got permanent relief. To this he grunted in dismay, and concluded he would endure awhile longer what he could not cure with the aid of a whole drug store and the advice of good physicians.

I wrote to Dr. Garretson, giving him a history of the case and as is usual with him, he replied promptly, stating that, from my statements my diagnosis was correct, and that an operation would have to be performed.

Finally, after about twelve more months of severe paroxysms, growing more frequent and severe, which would be brought by simply opening the mouth to speak, a stroke on the beard, or taking a morsel of food ; and after exhausting his drug store and physician's resources, he came up to have a final examination, bringing his physician.

I insisted again on removing the tooth, and if no relief was obtained, to have the severer operation performed. They left my office, to call again. In the meantime he visited his physician's dentist, who advised the removal of the tooth, and in attempting to extract it, broke it off even with the alveolar process.

An appointment was made with me for the next evening, at which time I proceeded to operate, with Dr. Olmstead as anæsthetist. With a scalpel the process around the running roots was made bare of the gum tissues. With cutting forceps I removed a piece at a time of the bone and roots, finally cutting down on the dental nerve, and removing a section of about half an inch. The roots of the tooth were in such a pipe stem state that every effort to extract them whole proved a failure. Hæmorrhage was very profuse, which delayed the operation very much. Not anticipating so extensive an operation at this time, I did not prepare instruments entirely suitable for exsection. In fact, I began the operation as alveolar tooth extraction, and wound up with nerve exsection. Had I expected to perform the exsection at this time, I would not have used the dental chair or office, but would have had the patient at his home, on a lounge.

About one hour after the operation, vomiting of the swallowed blood began, which so irritated the stomach that for two days only crushed ice could be tolerated. After about six days the patient was out, and to this day has not had a recurrence of the pain.

CASE SECOND.—Barbara Snyder, coloured ; age about 55 years ; of stout build ; cook by occupation.

About October, 1884, she felt the first twinges of pain in the right side of her face, which, as she expressed it "seemed to spread out like a thousand threads." For several months there was no definite location of pain ; it spread over the entire side of the face and scalp. After that time its local point was about the canine fossa, where it remained up to the time of the operation.

The paroxysms would recur every few minutes, with an occasional respite of a few hours. Simply passing the hand over the face or hair, or a cloth applied to bathe the face, would cause paroxysms. After seventeen months of suffering, the latter five very intense, and after exhausting the skill of a dozen physicians, and every suggested remedy without relief, I was called. I found the old woman hovering over a fire, with a shawl around her head, swaying from side to side, tears pouring down her cheeks, hope of relief gone, and wishing for death.

An examination showed her upper teeth gone, and only a few lower ones remaining ; had been extracted seeking relief. No lesion could be found. In fact everything presented a remarkably healthy condition.

Exsection was determined on, and the patient made acquainted with its character and probable results. She caught at it as a last means of obtaining relief. On the second day following, the patient was placed on a lounge (a most convenient arrangement for position) and chloroform administered to complete anæsthesia by K. C. Divine, M.D. With R. Y. Henley. D.D.S., to man my Bonwill engine, the operation proceeded as follows :

The gum on top of the ridge from the position of the lateral incisor to that of the second bicuspid was removed ; the bone on either side from the same points was made bare ; with a circular saw a transverse section at both terminal points was made ; the lateral flaps were held back, and the saw was passed on the labial and palatine sides, cutting from one transverse section to the other. With a pair of bone cutting forceps, a perfect section was removed ; then, with a large bur, the bone overlying the nerve was removed, and the nerve cut away.

While hæmorrhage was quite severe, very little blood was swallowed. The situation of the operation, and the position of the patient, afforded an easy direction of the blood out of the mouth. The wound was dressed with cotton saturated with carbolated water, five drops to the ounce, which she was directed to wash her mouth with frequently. It healed readily, and to-day, two months after the operation, the old negress is well, and is rejoicing.

CARIES OF LEFT SIDE INFERIOR MAXILLA.

This case, a very serious one, may prove of interest to the profession. A Sister of Mercy was suffering, as she supposed from odontalgia in a lower left molar. She visited a dentist who extracted, as he supposed, the offender, without giving relief. She returned to the same dentist a short time afterwards, complaining of jaw ache. Another molar was removed, without affording relief. A few months after, intense suffering causing complete prostration, ensued. An abscess about the size of a tea-cup formed at the angle of the jaw, involving the submaxillary gland of that side. This produced occlusion of the jaws.

Dr. F. H. O'Brien, an eminent physician, was called. The trouble, he saw at a glance, was a very serious one. He lanced the abscess, evacuating about a tea-cup of pus, so offensive that no one could remain in the room until it was deodorized. He became satisfied that it was a case requiring the care of a dental surgeon, and called in the writer. He had previously told the Sister that in all probability a part of her jaw would have tobe re moved. When I first visited her, in company with Dr. O'Brien, I found her in a very despondent mood, with hardly enough vitality to take interest in our visit. Pyæmia was evidently manifesting itself. Her jaws were so occluded that I could not make an oral examination. The abscess was ordered to be washed out repeatedly by injecting with carbolated water, and instructions given that she endeavour to move her jaws frequently during the next twenty-four hours. On the next day I still found the occlusion so great as to prevent an examination. She was urged to repeated trials of separation. After the fifth day I could introduce my finger, with which I discovered a molar very loose remaining. With some difficulty it was removed, when with a probe the characteristic honeycomb surface was revealed, showing beyond doubt, in connection with the nature of the discharge, caries of the bone.

A few days later, when I had better access to the parts, and when the patient was able to undergo the operation, I laid open the gum from the ramus to the second bicuspid, and pressed it away on either side, which was easily done, as the adhesion to the bone was very imperfect. With a good sized scraper the diseased surface of the bone was removed. Aromatic sulphuric acid diluted was applied on cotton to the whole diseased surface. While I was treating locally, Dr. O'Brien was successfully treating systematically. After about three month, she was entirely cured.

British Journal of Dental Science.

LONDON, JUNE 15, 1886.

HONOURS CONFERRED UPON THE DENTAL PROFESSION.

One of the most wisely-chosen recipients of the honour of knighthood is, unquestionably, Sir John Tomes. A man who wins his way to the forefront of his profession and yet makes, rather than loses, his friends is no very common character, yet this has occurred in the instance of Sir John Tomes. Outside the range of dentistry his name is known and respected alike as a scientist and as a representative of an ever-increasing and prosperous profession. In the presentation of this knighthood, Her Gracious Majesty has, for the second time, signified her approval of and sympathy with the profession of dentistry. The honour is not only of a personal application but reflects upon the whole profession, and reminds its members that their honest labours in the field of science do not pass unnoted, that the guerdon, if delayed, will in time be conferred on those whose deserts merit it.

Sir John Tomes' career presents many points of interest. Descended from a Gloucestershire family, he worked with a view to practice as a medical man, being apprenticed to a general practitioner in Evesham. Upon coming to London, he studied first at King's College, and subsequently at Middlesex Hospital, holding resident appointments for some time. At this period he was thrown into contact with the leading spirits of the day—Sir Thomas Watson, Mr. Campbell de Morgan and Henry Arnott.

His earnestness of purpose and scientific acumen won for him their friendship and regard. It was, we believe, owing to the strong recommendation of Sir Thomas Watson that he devoted himself to dentistry.

The scientific work done by Sir John Tomes, in connexion with caries and comparative dental anatomy and dental pathology is too well-known to need mention. This work was considered so excellent that that much-covetted honour—the Fellowship of the Royal Society—was conferred upon him in 1852. But in yet another sphere of activity lies the main interest to the dental profession, namely, in dental politics. Perhaps no man in the profession has done more to make dentistry what it is and to exchange the cloak of something like obloquy which formerly attached to dentistry for a covering of respect and honour. The Royal College of Surgeons, in applying for a charter to enable them to grant a diploma in dental surgery, were influenced largely by a few resolute spirits upon the council, and it was mainly owing to the personal influence of Sir John Tomes with these that the matter was brought forward, and became accomplished fact. Following closely upon the foundation of the L.D.S. came the Dentists' Act, and here again we find his strong and resolute bearing doing no small share in the promotion of that measure. If we merely confine our attention to these two acts of a long and energetic life, we cannot but be struck by the enormous changes and advance in dental politics which this one earnest man was able to assist in. A dentist, and yet more than a dentist, a scientist meeting his fellow scientists from all the many departments of learning, who yet held his own profession in such regard as to dare and do all his might on its behalf, could not fail to move mountains, and those who know what dentistry was and what now it is, are aware that the mountains were, in no sense of the phrase, mole-hills. Where a narrow or hot-headed man would have failed, Tomes, from his breadth and calmness of judgment, succeeded, and succeeded in doing much in welding together the heterogeneous elements of the dental profession. A further work in which he took much interest was the London Dental Hospital, of which he was one of the founders. In its career, from a small beginning to its present creditable condition, Sir John Tomes has shown a lively interest, and it is in no slight degree that this hospital has to thank the two dental knights—Sir Edwin Saunders and Sir John Tomes. In conclusion, we feel that while we heartily congratulate Sir John Tomes on the well-merited honour accorded to him, we must congratulate ourselves that our profession holds such men, and, in spite of its short-comings, maintains their regard and sympathy. We trust Sir John Tomes will long enjoy Her Majesty's gracious distinction.

THE BENEVOLENT FUND OF THE BRITISH DENTAL ASSOCIATION.

It is proposed to hold during the Annual Meeting in August an exhibition of works of art, executed by members of the profession. The exhibition will take place in one of the rooms of the London Dental Hospital, Leicester Square. All persons who are willing to either lend objects for exhibition, or, better still, will send them for sale, should communicate at once with the Hon. Secretary, Mr. George Parkinson, 36, Sackville Street, Piccadilly. All proceeds from sales and the exhibition will be devoted to the Fund and so it is hoped that everyone who is able will do his utmost to help on so excellent an object. The provincial members are sure to receive boundless hospitality from their London *confreres* whom they cannot, of course, recoup, would it not be an excellent plan to give to the Fund, just so much as the hotel expenses would have come to, had they been obliged to put up at the "Grand," "Morley's," or elsewhere?

THE TREATMENT OF NEURALGIAS.—Various forms of neuralgias have been successfully treated in Paris, by Tenneson, with a spray of chloride of methyl. The application must not be continued for more than a second or two, as escharring or vesication may result. Tenneson's cases were mainly those of sciatica, but there seems no reason to suppose that chloride of methyl should be less efficacious in neuralgias of the fifth pair than in other cases when nerve irritation exists.

Another Death from Hæmophilia following Tooth Extraction.—A death is reported from Manchester under very painful circumstances. We are not in possession of very full particulars, and should like to hear the story from the dental practitioner. It appears that a grocer named James Wood, aged 34, had been ailing for some six months anterior to May, 1886, when he died. The indisposition became more pronounced early in May, when bleeding from the mouth and nose commenced. At this time he suffered from tooth-ache, and for the relief of this he sought the aid of a dentist who, it appears, removed the tooth. However, the hæmorrhage became worse, aggravated, presumably, by the extraction. The unhappy man was treated by an irregular practitioner, and finally succumbed to loss of blood, May 22nd. The medical evidence given at the inquest went to show that the treatment the man received was inadequate to the gravity of the disease. One doctor is reported to have stated that the administration of large doses of a persalt of iron was the best treatment.

These cases are interesting to dentists for the following reasons :—We are often required to treat the teeth of such patients, and are only too frequently left in the dark as to the nature of the case presented to us. In the instance narrated above, there was, presumably, the evidence of hæmorrhage from the mouth and nose, evidence possibly overlooked, as spongy conditions of the gums and pharyngeal congestion provoke similar oozing. At the same time, there is no doubt that all dentists should be upon the look-out for the condition. Again, where the question of treatment comes in, we are bound to confess that we know of absolutely no drug given internally upon which any confidence can be imposed. The first rule, of course, is to avoid all cutting operations such as formal ligature of vessels, and next comes the local treatment. Experience has shown over and over again that local treatment transcends in importance every other plan. Styptics and mechanical apparatus for securing firm pressure upon the bleeding surface must be assiduously employed, and when once the oozing has ceased no endeavour should be spared to secure absolute rest for the part and the avoidance of any rough handling such as might dislodge clots or break scabs.

Dimethylacetal and Chloroform as an Anæsthetic Mixture.—In *Deut. Zeitschr f. Chirurgie*, 1885, Bd. xxi. Hft. 5 u. 6, F. Fischer states that he has used the anæsthetic mixture recommended by Mering, of one part of chloroform to two of dimethylacetal ($C_4 H_{10} O_2$) in 150 cases at the Strasburg clinique. The advantages of this mixture over chloroform alone are :—The early stages of mental agitation and muscular excitement do not occur, the patient quickly becoming insensible. There is no vomiting or retching during anæsthesia. The patients regain consciousness very quickly, and no disagreeable after-effects are complained of. At present the costliness of the drug is a bar to its general use.

Abstracts of British & Foreign Journals.

DENTAL COSMOS.

THE PIN AND PLATE BRIDGE.

By Wilbur F. Litch, M.D., D.D.S., Philadelphia, Pa.

The writer has described a method applicable especially to incisors and cuspids, for the permanent attachment of artificial teeth. This form of bridge-work may be designated the pin and plate bridge, as distinguished from the crown and bar bridge certain modifications of the original plan of construction are given in this paper, produced as far as they have been found available.

To Make a Pin and Plate Bridge.

1. Take in plaster an accurate impression of the cuspid and incisor and the interspace. From this obtain a plaster model of the parts.

2. Make from pure gold, rolled to the thinness of 26 gauge, base plates, to be carefully adjusted to the palato-approximal

surfaces of cuspid and incisor. These are made by swaging on dies and counter-dies obtained from the model, or by bending the gold into shape upon the plaster model.

3. Select a plain plate porcelain tooth of suitable length, shape, and shade, and wide enough to fit easily into the interspace. The neck of the tooth to rest lightly upon the gum.

4. With pure gold or platinum make a backing for the porcelain tooth.

5. Place the tooth thus prepared and the back-plates already made upon the cast accurately adjust the approximal edges of the base-plates to the backing of the porcelain tooth *in situ* upon the cast.

6. When this adjustment is made, cement together the base plates and backing with a brittle, resinous cement (resin, two parts ; wax, one part ; or sealing-wax will answer), and before the cement has fully hardened remove from the cast to position in the mouth, perfecting the final adjustment there. Each piece of the appliance must be fitted with absolute accuracy to the surface for which it is designed. This being accomplished a stream of ice-cold water from a syringe is thrown on this plaster cement ; this renders the cement perfectly brittle and incapable of bending. Then remove from the mouth and invest in a mixture of equal parts of marble-dust and plaster-of-Paris.

7. After the investment has firmly set, solder the base-plates to the backing, and the backing to the platinum-pins of the porcelain tooth, using as a solder 20-carat gold. The porcelain tooth being usually thinner than the natural teeth, there is an angle or depression in which the thickness of the gold can be considerably increased without interfering with occlusion.

8. For the purpose of attaching the denture as thus far constructed, drill a small cylindrical opening through the palatal surface of the enamel of the cuspid and incisor respectively. Sometimes, owing to a close occlusion, or to the contour of the tooth, it is desirable that they should be attached nearer the neck of the tooth. Each opening should be well undercut, but must not encroach upon the dentine far

enough to endanger the pulp. The openings should admit a platinum pin-head (13, standard gauge) with a shank of 18, standard gauge. Into each of these openings fit a platinum pin of the size indicated. The head of each pin must be made thin and perfectly flat on its upper and under surfaces.

9. In each of the base-plates make an opening corresponding in position to those in the natural teeth. Pass through those openings and cement in them the free ends of the platinum pins. While the cement is plastic, place the denture in position in the mouth, and press the pin-heads into the openings made for them, and burnish the base-plates into perfect contact with the palatal surfaces of the teeth; chill the cement, remove and invest as before, and with 20-carat gold solder the pins to the base plates, flowing upon them and the backing as much of the solder as may be necessary to give them the desired thickness and rigidity.

To Attach the Bridge.

Oxyphosphate cement should be used, let it set slowly. Thoroughly dry the teeth and denture; mix the cement thick. A thick, viscid, semi-fluid mass is what is required. The cement is placed around the head and shank of each platinum pin, and in the openings in the natural teeth. In packing the cement around the pins the under surface of the base-plates should be covered.

The denture is then placed in position, and with broad-pointed, serrated instruments pressed firmly into place, the excess of cement should ooze at the margins.

To secure the most rapid and the most thorough admixture of the phosphoric acid and zinc oxide, a thick plate-glass slab, four inches square, with a flat surface, should be used. The spatula should be of steel, thin and elastic, and six-tenths of an inch wide.

To prevent excessive heat prejudiciously affecting the cement, the mixing-slab is placed as well as the acid and oxide bottles, in cold water until their temperature has been considerably reduced.

In severe winter weather the acid and oxide may form a powdery unworkable mass which melts down into an almost fluid condition when brought into contact with the warmth of a tooth *in situ*. A temperature between 60° and 65° F. is best.

Application to Pulpless Teeth.

In devitalized teeth, the base-plates can be sunk into the palatine surface when they interfere with occlusions the pin holes made larger and the pins themselves increased in size. The difficulty can always be overcome by carrying the base-plates as far away from the cutting-edge as practicable, and making them at the point of contact as thin as is consistent with strength.

Repairing.

The least difficult method of repair is to separate the tooth and backing from the base-plates singly. Another tooth is then selected, fitted, backed, and soldered as before.

As a rule the writer has confined the use of this form of bridge to cases in which only a single incisor is missing, but he has successfully attached a front and lateral incisor to a cuspid and the remaining front incisor. Where an unusual strain is to be expected the retaining-pins and pin-holes should when practicable be made correspondingly large, or two smaller pins may be anchored in one tooth, which latter gives very great resisting power and renders removal in the highest degree difficult and laborious.

SPREADING THE DENTAL ARCH.

By E. S. Talbot, M.D., D.D.S., Chicago, Ill.

In spreading the dental arch the majority of cases require the greatest pressure on the anterior teeth, and an appliance which can be placed inside the arch will exert the greatest influence. The force is equally distributed on both sides of the mouth, and if constant the work will be accomplished rapidly and without inconvenience. Dr. Talbot has used a plate made to fit the teeth and alveolar process, and cut away so that the anterior parts extend far enough forward to enclose the teeth to be moved. A piece of wire is bent into forms corresponding with the arch with the fixed point corresponding to the coil and two free arms in each side which press out the sides of the arch.

Grooves are cut into the anterior and posterior parts of the plate. Holes are drilled at these points, and the wires tied to the rubber plates. In order that the anterior teeth may be moved with the greatest force, the arms are so adjusted that the greatest pressdre is exerted on the anterior parts of the plates. This appliance is readily removed for cleansing and returned to place by the patient.

ODONTOGRAPHIC JOURNAL.

EFFECTS OF AMALGAM FILLINGS UPON THE SYSTEM.*

By E. A. Bogue, M.D., New York.

"The effects of Amalgam Fillings upon the System." There are none, so far as proven. Dr. Hitchcock, Dr. Talbot, and Dr. S. P. Cutler, have all made experiments, most of which have been carefully conducted. The conditions which existed in the mouth have been detailed.

Dr. Talbot says in his experience: "A sufficient portion of the material is rubbed in the hand and placed in the tooth." Good amalgam fillings are not made in that way, but the constituent parts are carefully weighed and the proper proportions preserved. Eight experiments were made by Dr. Talbot, by heating amalgam fillings in bottles to about 100 degrees, and a vapour was given off, blackening test paper; yet this same article notices other large amalgam fillings which were kept three months at 100 degrees that showed no change, and in others he notes an increase in weight from oxidation that has taken place.

Amalgams well made will not part with their mercury under about 400°.

Dr. Bogue's experiments in 1883 explain some other facts. A large variety of amalgam fillings were kept at 100° for three months, but were kept in saliva, and they seemed to gain in weight. They were all weighed down to one-ten-thousandth of a gramme. But in the varieties tested by the author there was no mercury found in the bottle.

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*Read before the Dental Society of the State of New York.

Dr. Pease says he has never seen any bad effects in any of his patients from amalgam fillings used in connection with gold, and he then calls attention to the blue mass pill so often administered, which takes three days to work off. He asks what becomes of the mercury lying in the system during those three days; has it or has it not been absorbed? He assumes that there are cases of administration of mercury from drugs where poisoning would occur more than from fillings in the teeth.

If amalgams are inserted with a large surplus of mercury the metallic mercury may be found in the mouth after the pressure that is applied to the filling brings the mercury to the surface, and from there is carried to the stomach as metallic mercury.

Metallic mercury, he thinks, is harmless unless converted into an oxide or chloride.

THE INDEPENDENT PRACTITIONER.

ANTICIPATING CARIES.

By C. E. Francis, D.D.S., New York.

The writer points out that the various degrees of preservation of teeth depend on many and complex conditions. Much depends on shape, arrangement, texture or degree of density, and the physical condition of their possessors. Much also in the way of their preservation depends on proper use, methods of cleansing or degree of cleanliness, a systematic observance of hygienic laws, and by frequent examination and treatment by a dentist.

A crowded dental arch favours proximal decay, the most vulnerable point being the point of enamel contact. Extraneous accumulations that work their way into the dental interstices are retained in their cervical pockets, and when in a state of fermentation cause mischief to the enamel walls. The poorer the quality of enamel structure, the greater is the danger to be apprehended from agents of decalcification. Teeth of a low-toned or impoverished character, if crowded, are sure to be attacked by proximal decay, and especially the superior bicuspids, and incisors where overlapping occurs.

Enlarging the dental arch, by means of regulating appliances is one way of obviating this cause of caries. Room is also frequently secured by extracting one or more teeth, according to requirements. This practice, as a means of anticipating or preventing the formation of caries has been earnestly recommended and largely adopted. No one will dispute the assertion that the timely removal of a single tooth has, in innumerable instances, been the means of saving several from destruction. A smaller number of teeth than the usual complement if kept healthy and free from caries is better than the thirty-two ill-placed and carious teeth. Dr. Clowes says, "enamel contact is always a menace of danger," and in order to give relief to a crowded arch he would "weed out" the sickly occupants to make room.

On the other hand, many excellent dentists prefer cutting away the proximal surfaces of the teeth, rather than to obtain space by extraction. With adult teeth of good texture, this practice, in many cases seems to have answered the purpose intended, and has saved the teeth. Thousands of teeth have been separated by means of files, discs, and chisels, to save them from decay, and in some instances, although reduced to unsightly slabs, have for years firmly maintained their integrity.

As a rule, where the dental arch is unduly contracted, the teeth irregular or crowded, much benefit may be derived by expanding the arch with mechanical devices. This will sometimes accomplish the object desired. If, in irregular and crowded conditions, where the teeth seem impoverished, the enamel rough or abounding in pits and showing unmistakable evidences of proximal failure, it is good practice to remove either the sixth-year molar or one of the bicuspids on either side of one or both arches, according to circumstances.

Where extraction is the resort for anticipating caries, it should be done sufficiently early in life to obtain the space required. Every year's delay, after the eruption of the second Molars, lessens the chances of gain by this means.

One of the principal objections to the removal of the above-named teeth is, that a part of the masticating surface is lost thereby. The loss of this little surface for a brief period of time (or until the spaces close up) will ensure a much larger masticating surface for a life-time.

If space is to be obtained by cutting away the tooth structure, it is important to consider the nature of the material to be thus treated, and to do it *artistically.* Compact and yellow teeth in the mouth of an adult will bear the effects of cutting better than the more delicate and pearly-looking ones. Children's teeth are less benefited by having them filed apart, and the expediency of thus treating them is (as a rule) one of serious doubt.

The main objections to cutting away the proximal surfaces are, that their contour is destroyed, and the spaces thus formed are productive of annoyance in masticating food, but it is argued that even this is better than to have them *decay* away.

Literary Notices and Selections.

IS DECAY OF THE TEETH AN INFLAMMATORY OR A CHEMICAL ACTION?*

By W. Xavier Sudduth. M.D., D.D.S., Philadelphia, Pa., Director of the Physiological and Pathological Lab. in the Medico-Chirurgical College and Demonstrator of Histology in the Philadelphia Dental College.

(Concluded from page 524.)

There is another point of dissimilarity between caries of bone and decay of teeth,—viz., the two processes do not give the same reaction when sections of each are stained with picro-carmine. This fact is mentioned by Dr. Miller, who says that "anyone who has given time to the study of inflammation, particularly of bone or cartilage, will at once be impressed with the fact that there is not the slightest similarity between it and caries dentium. Furthermore, the action of different colouring matters upon carious dentine furnishes information of considerable interest; for example, picro-carmine colors the simply decalcified, otherwise unchanged, basis-substance pink or red, while the distended tubules or round or oval cavities, filled with debris and fungi, are stained yellow. This reaction is in marked contrast to that of pulp tissue, periodontium, bone cartilage, etc." I have often noticed this point of difference, and can fully agree with Dr. Miller. Here again comes in the need of broad experience in the action of the different stains in the various pathological processes.

Differential diagnosis by means of stains is a point well-known to those who are conversant with the different chemical reactions of tissues. It is by reason of these variations that we are able to obtain different colors from the same stain in a section which contains more than one tissue. In accordance with this knowledge we can, with a considerable degree of certainty use stains as aids in diagnosis.

The result of inflammation in the bone is aggressive, and is very apt to be followed by a loss of bone tissue. Inflammation of dentine is a defensive process, and through its action barriers are thrown out to stop or hinder the advance of disease. This is well known to every observing dentist, and I need not stop to enter into its discussion except to mention the translucent zone and the development of secondary dentine. In my opinion, enamel is nothing more nor less than a coat of mail supplied by nature to protect the dentine, by furnishing a hard surface, and to answer the process of mastication. The presence of any considerable amount of organic material that would entitle it to the dignity of accrediting to it an inflammatory action would be just so much against the proper fulfillment of its office. Nature, when left to herself, developes a beautiful and symmetrical object, perfectly capable of subserving her purposes. But, then, you say, why does not enamel resist decay? You might with equal propriety ask why do we sicken and die? Simply because we have transgressed nature's laws. God in his wisdom created man physically perfect. Man in his weakness has perverted this nature, and disease has followed as a natural consequence of his transgressions. The nearer we can put ourselves in harmony with nature the better able shall we be to interpret her creations. If we enter upon our investigations without preconceived ideas, with open and receptive minds, we shall find that many of the processes which we are trying to make out as intricate and obscure will be plain and easy to understand.

The normal condition of the fluids of the mouth is neutral or alkaline, and any deviation from this state is pathological. Enamel was not intended to resist pathological conditions. It was created to fulfill the requirements of nature when the surroundings are normal. Decay of enamel is the result of the melting down of the lime-salts that constitute it, by an acid condition of the saliva. This pathological condition of the secretions of the mouth frequently accompanies some form of general disease, as diabetes, gout, or gastro-intestinal disorders. It is also often observed in parturition, which, by reason of our present way of living, has come to be reckoned among pathological conditions. Morning sickness is an almost constant accompaniment of parturition, and there is seldom any attempt made to neutralize the acid fluids of the stomach, which are so frequently found in the mouth at such times. Local diseases of the gums or mucous membrane of the mouth often give rise to acidity of the secretions. Pathogical conditions of the glands that empty into the mouth, and acid foods and medicines, without doubt play an important rôle in decay. I think that sea-sickness has a great deal to do with the rapid destruction of the teeth of foreigners (servant girls) which is noticed soon after their arrival in this country, rather than the oft-repeated explanation of change in habits and diet. The fluids of the stomach are normally acid, but are decidedly pathological when brought into contact with the teeth for any great length of time. I have never seen any attempt at cleanliness evinced by steerage passengers after paying their debts to Neptune, and I think that all will admit that the use of the tooth-brush is an art that is acquired after their arrival in this country, if learned at all. The idea that all foreigners have good teeth is fallacious. I saw more toothless women in Europe last summer than I ever saw in America in the same length of time. The latter appearance, however, may be partially accounted for in the fact that the masses in America can better afford to have lost teeth replaced, and do so.

Above all the before-mentioned conditions which favor decay, I consider the most active agent to be an acid developed at the seat of decay by acid fermentation. Dr. Miller of Berlin, has very conclusively shown that this fermentation is produced by micro-organisms. He has isolated twenty-two separate forms, and has cultivated them sufficiently to classify them and note their principal reactions, whether acid or otherwise. He says, "Sixteen produce an acid reaction in a solution of beef extract, pepton, and sugar, and for the rest the results were not satisfactory ; sometimes the reaction being acid, at other times neutral or alkaline, depending upon the material used for their culture. Some which have an acid reaction in a fermentable solution give rise to an alkaline reaction in non-fermentable solutions." According to Dr. Miller, "decalcification is produced chiefly by acids resulting from the action of these organisms upon certain of the carbohydrates in the human mouth, while the peptonization is produced either by the direct action of the protoplasm of the organisms upon the decalcified dentine or by a ferment which they produce." Three years ago I gave considerable time to the study of micro-organisms found in cavities of decay, staining them by the best-known methods at that time. I succeeded in satisfying myself that no micro-organisms ever penetrated the dentinal tubuli beyond the point of decalcification. The dentinal tubuli are impervious to the entrance of these organisms while they are in a healthy state. As a contribution to this part of dental discussion, I presented these slides, with others, at a lantern exhibit given before the Illinois State Dental Society, and stated my convictions on the subject at that time. These were ground sections. I have since cut sections of the decalcified mass found in cavities, and demonstrated several of the micro-organisms figured by Dr. Miller. My sections also fully confirm his statements regarding their presence in the tubuli of this portion of decay. I can fully substantiate what Dr. Miller says, viz., that "micro-organisms can, and often do, not only distend separate tubules, but push whole tubuli aside, and these foci are the points figured by Dr. Abbott as 'bioplasm bodies.'"

For the demonstration of micro-organisms of decay we take as large a portion of the soft decalcified mass found in the cavities of decay as we can detach by aid of a broad, hoe-shaped, or other suitable excavator, and place it in alcohol. After the water has been thus removed we imbed in mucilage or celloidin upon cork, and cut sections with a microtome or razor. These can be cut quite thin, as they are completely decalcified *by the acids of the mouth.* After cutting sections, place them in an aqueous solution of any aniline dye, preferably fuchsine. After staining, place in absolute alcohol and remove excess of stain; then dehydrate in oil of cloves or cedar, and mount in balsam. The only acids that come in contact with the specimens are those found in the cavity of decay. The methods necessary for the examination of these micro-organisms are about the simplest of any in use in the study of mycology; and their demonstration the easiest of all the forms we are called upon to study. For some forms of bacteria, however, the methods are more difficult, and their demonstration has taxed the knowledge of our best chemists. Among the most difficult to study have been the tubercle bacillus and the bacillus of lepra. Spores have always been extremely difficult of demonstration, but are now pretty generally understood, thanks to the untiring efforts of such men as Koch and Hueppe.

The bacillus lepræ spores, and tubercle bacilli can be put into a twenty-five per cent. solution of nitric acid, then through two separate baths of absolute alcohol, and yet hold their stains,—provided the staining fluid which contains the sputum or spores is brought to a boil or left for twenty-four hours. It is the knowledge of these properties of bacteria in general on which we base our assertions that certain foci indicate micro-organisms. But it is not essential that we depend even upon this knowledge. We can take portions of the suspected material, while it is fresh, and cultivate it upon gelatine or other suitable media. After cultivating it through several generations, until we have produced a pure culture, we can prepare a cover-glass, stain and study the isolated organisms. But even this is not sufficient to establish the fact of their being the active agents in decay of teeth. The demonstration of the persistent occurrence of these organisms is of very little import unless the investigator cultivates them and produces decay by their action upon teeth placed in the culture solution. Dr. Miller has done this by the action of some of these organisms on dentine, which I cannot distinguish from decay produced in the mouth. And, further, he has by difficult chemical analyses proven that the special acid concerned in decay is lactic. In this latter direction he has gone farther than most mycologists. Not only is it necessary to produce decay by the fungi, but the destructive acid must also be determined.

I have studied nearly all the pathogenic bacteria in tissues, and have *cultivated* quite a number of the non-pathogenic, together with a few pathogenic forms, and so feel capable of judging the character of the work done by Dr. Miller. Very few are aware of the immense amount of labour involved in the study of micro-organisms. My reason for quoting Dr. Miller so extensively on the point under discussion is that I have not sufficiently studied the special fungi concerned in decay to offer an opinion unsupported by corroborative testimony. I believe in the reliability of Dr. Miller as a scientific investigator, and my belief is based upon the scientific manner in which he has done his work, and the uniform willingness he has shown in allowing others to see the slides and cultures from which he has drawn his conclusions. The fact that he is quoted by such an author as Ziegler shows that he is regarded by his colleagues as an original and trustworthy investigator. Dr. T. Michell Prudden met Dr. Miller last summer in the laboratory of Dr. Koch, and speaks very highly of his work. I have in my possession a culture of a comma bacillus which was discovered in the mouth by Dr. Miller, and which has received the name of Miller's comma. The standing of a scientific man is in proportion to the honesty and industry with which he works, and I think that I have now cited points enough to prove that Dr. Miller may be safely quoted as reliable authority on the subject of decay.

In conclusion, it may not be inappropriate to speak very briefly of the position of dentistry in regard to scientific research. I fear that we do not as a body realize the importance of putting all our statements on a scientific basis, and submitting them in a scientific manner. We are too apt to base our theories upon information about different phenomena, instead of building them securely upon active knowledge of visible results. Gentlemen, this may have done in the past, but it will not do now. Scientific investigation is constantly changing the points of view from which we have been in the habit of regarding various pathological conditions; it keeps on presenting new suggestions and new discoveries. To meet this advancement it is required that we subject all our theories to the crucial test of careful experiment. Nor is this all: we must be able to *show* the results from which we draw our conclusions.

The day is passed when simple assertions or drawings of other men's work will suffice to establish a scientific point, and our profession will never be the power it might be until as a body we recognize the true value of the experimental investigation of actual facts wherever these are accessible to study, and demand that all pathological questions connected with our work shall be pursued from a scientific standpoint, and the visible results presented for investigation. If we would be forceful men in the domain of science we must present facts for authority, not authority for facts; we must freely give the methods by which our knowledge is augmented, and allow others to study and weigh our work. Above all must we be prepared to modify our views or abandon them if errors should be discovered and plainly pointed out.—*Dental Cosmos.*

HISTORICAL REMINISCENCES.

By C. S. Chittenden, D.D.S., L.D.S., Hamilton, Ont.

(*Continued from page 318.*)

In the same year Dr. S. P. Hullihen, of Wheeling, Va, set forth a new system for treating exposed pulps, which he and somebody else named "Rhizodontryphy-Neurhamaxis," and yet the world revolved much as it did before.

In common with many others I "Rhizodontryphied" a great many nerves. A few did well, but the operation was so unsatisfactory that it was soon dropped. It appears that a Mr. S. P. Miller, of Worcester, Mass, discovered or invented the identical operation, which the Boston people called "Neurhamaxis," and the eastern people "Neurhamaxised" nerves for a year or two, during which the Hullihen partisans fired "Rhizodontryphy," and the Miller partisans let fly "Neurhamaxis" at each other, till it was most alarming. Both are at rest now.

In April, 1853, Mr. Alfred J. Watts, of Utica, N.Y., obtained a patent for the manufacture of sponge gold. This was the first move in the direction of contour filling. For some time Mr. Watts was not successful in producing gold that would save teeth, and complaints were made of a blue line about the margins of the cavities filled with it, which would increase till the filling could be proved to be defective. The profession ought to raise a monument to Mr. Watts, as it was from this preparation of gold that the first adhesive foil was made.

Dr. Spooner had, some years before this, introduced the idea of destroying pulps with arsenic, and in my early dental days many dentists were in the habit of devitalising the pulp on one day and filling it on the next, without attempting to remove the pulp at all. As a matter of course, there was trouble in most cases, so that, too, soon lost caste.

About 1854, some one suggested the idea of retaining partial sets of teeth by atmospheric pressure. I cannot remember who first proposed this method of insertion, but it met with a great deal of opposition at the outset, and did not come into general use for some years.

In 1855, Mr. J. R. Quinton, of London, Eng., introduced congelation as a local anæsthetic. Like hundreds, I invested my hard-earned dollars in two or three different forms of apparatus for producing local anæsthesia, but it was a decided failure.

In 1856, rubber was brought out as a base for artificial teeth. Probably no one appliance pertaining to dentistry has ever been received and adopted by the profession so universally as this one. It is *the base* which is found where artificial teeth are inserted. In the same year Blady's cheoplastic method of mounting artificial teeth was given to the public. It had its advantages for lower sets, but rubber soon pushed it to one side.

In the early part of 1858, Dr. Harvell Burdell was found dead in his office, having been murdered by some unknown person during the previous night. His taking off created a great sensation at the time, but no definite solution of the cause or manner has ever been made.

In the same year Dr. Robt. Arthur informed the profession that he had discovered a simple method of keeping proximate cavities dry while operating, which was to cut off a piece of rubber tubing, such as is used in regulating teeth, and slip it over the crown, and up or down on the neck of the tooth to be filled, thus forcing the gums away. It was a move in the right direction. It was in this same year that Slayton's coloured gutta-percha base for artificial teeth was brought out. Of all the innumerable humbugs that have been imposed on the profession this was about the biggest.

I ought to have stated that the American Dental Convention was formed, or rather organised, at Philadelphia during the 2nd, 3rd, and 4th days of August, 1855. I felt a little curiosity to look over the list of names of those who attended that convention, and was surprised to find only one name from Western New York, viz., Dr. Fenn, of Rochester.

This meeting had been called by a committee of members of the profession, which met at Philadelphia during the previous year. A constitution had been formed, and everything so carefully prepared by the committee that the convention was born and ready for action on the day of its birth.

In 1856, the convention met in Hope Chapel, New York, on the 6th of August, and continued in session through the 7th and 8th. I find no names from Western New York, except L. D. Walter, of Lockport, B. R. McGregor, of Rochester, and S. B. Palmer, of Tully.

The year 1859 is the most memorable one in the annals of dental science. On the 3rd of August, of that year, delegates from the Cincinnati Dental Association, Ohio College of Dental Surgery, Mississippi Valley Association, Ohio Dental College Association, Pennsylvania College of Dental Surgery, Western Dental Association, Penn. Association of Dental Surgeons, Indiana State Dental Association, St. Louis Dental Association, and Pittsburg Dental Association met at Niagara Falls, "to determine upon the expediency of forming a National Dental Association upon a representative basis," and, although a meeting of the dentists of New York city, held during the previous month, passed resolutions protesting against the formation of such an association, declaring that the American Dental Convention was all that was required, the delegates proceeded to, and did, form the American Dental Association. Meetings have been held annually since, with the exception of the first year of the late war, 1861. The work performed by the Association has been most extensive and valuable, and is as familiar to you as to me. The Dental Convention, too, proved most useful, but in another direction.

In January, 1867, Dr. B. W. Day, of Kingston, Ont., called a meeting of the dentists of the Province, at Toronto, for the purpose of asking the legislature to incorporate the profession. As only seven responded to the call, those present formed themselves into a dental society. A committee was appointed to draft a bill, which was to be laid before a meeting of the dentists of the Province, to be held at Cobourg, in the following July. The meeting at Cobourg was well attended; the draft of the bill was fully considered, and eight persons were recommended to Parliament to represent the profession on the Board of Examiners. Let it be remembered that this was the first attempt at dental legislation.* As it had to be in the nature of things, a popular measure with the profession in order to get it passed at all, the wonder is that it is as good a bill as it is. It is awkward in many of its provisions, and hard to be understood in others, still I think it is the best dental act in existence. Petitions poured into the legislature from many quarters against the passage of the act. The promoters were at times greatly discouraged, but, as "All's well that ends well," on the last night of the session the bill was read a third time and passed. It is not necessary to add more on the subject than to say that the act has been very successfully carried out from the first, and that there are now very few practising illegally in the Province. Since the passage of the Ontario act, the province of Quebec, England, several of the Continental States of Europe, and most of the different States of the American Union have legislated upon the subject of dental practice; but whether the profession stands in a better position now than it did previous to any legislation, is a matter of question which time alone can decide.

I cannot close this paper without speaking of the different manners of dentists in my early dental life, and now. Then, if you called on a brother practitioner he would treat you as an interloper, and if you proposed to speak on matters dental, he would tell you (as I have been told) that "no information can be obtained from me without pay." Now, we meet like brothers, and consult on the best methods of procedure. The dentists of to-day can well quote Mark Twain's saying—"the amount that the ancients didn't know is voluminous"—and not be far astray, and yet they did a great deal of good work, when the appliances they possessed are taken into consideration. Let me speak of a few of those which we consider perfectly indispensable now, but which were unknown in my early life. The operating chair, with all its conveniences; the lathe, napkins, duct compressors, the hand, the automatic, and the electric mallets, the dental engine in its various forms, the rubber dam, the different adhesive forms of gold, and many, many other appliances of minor yet of great importance to the dental operator. The profession at large owes a debt to the old Western New York Society, a great number of these appliances are the inventions of some of its members. From one, dental colleges have become legions, almost. Dental societies have sprung up all over the land. Dental journals, from one or two small quarterlies then, to numerous large, well-edited periodicals of the present. Then, the dentist was scorned by the physicians ; now, he is treated like a brother, and there seems little doubt that the dentist of the near future will acknowledge a specialist of the medical profession.—*Independent Practitioner.*

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*The State of Alabama had upon her statute books a very stringent dental law, which antedates that of Canada by nearly ten years—Editor.

WORK DONE AT THE LONDON DENTAL HOSPITAL

During the Month of May, 1886.

Number of Patients attended		
Extractions	Adults	405
	Under 14	876
	Anæsthetics	734
Stoppings.—	Gold	281
	Other Stoppings	1249
	Advice	119
	Irregularities	125
	Miscellaneous	141
	Total	3930

H. Lloyd Williams, M.R.C.S., L.D.S., House Surgeon.

BIRMINGHAM DENTAL HOSPITAL.

April, 1886.

Number of patients	985
Extractions	666
Completed Fillings	73
Gold Fillings	8
Dressings	67
Irregularities	4
Miscellaneous	134
Anæsthetie Cases	33
No. of Operations	1970

W. Palethorpe, House Surgeon.

British Journal of Dental Science.

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THE MUCOUS MEMBRANE OF THE MOUTH,

WITH SPECIAL REFERENCE TO ITS PHYSIOLOGY AND PATHOLOGY, AND THE PART PLAYED BY ITS SECRETIONS IN THE PRODUCTION OF DENTAL CARIES.

By Edwin A. Cormack, L.R.C.P. & S., L.D.S. Edin.

(*Concluded from page* 540.)

INFLUENCE OF THE SECRETION OF THE MUCOUS MEMBRANE ON THE PRODUCTION OF CARIES.

From the earliest times the causation of caries has occupied the attention of those who devoted themselves to dental pathology. Since the time of Vespasian (90–120 B.C.), when Aretæus confessed that "the cause of toothache is known only to God," many investigators, more enterprising than he, have made innumerable observations and propounded theories more or less satisfactory. It was known about the beginning of this century that certain acids found in the mouth were capable of decomposing the teeth; but caries was generally believed to be due to some inflammatory agency situated within the tooth, hence the term *caries interna.*

In 1835, Robertson of Birmingham considered that caries was due to "the corrossive chemical action of the solid particles of food which had been retained, and have undergone a process of putrefaction or fermentation in the several parts of the teeth best adapted for their reception." Since then numerous theories have been advanced. Mr. Tomes, in 1859, advocated the chemico-vital theory. He believed that acids, whose origin he referred to the mucous and saliva, resolved the tooth into its histological elements, and that the dentine exerted a resistive force, or alternatively, that caries was to some extent inflammatory.

Magitot, in 1869, elaborated the theory of resistance and consolidation of dentine, but eliminated the idea of inflammation.

The year after, Leber and Rottenstein demonstrated the presence of leptothrix granules in the dentinal tubes. Hence they denied the reaction of dentine. To caries of the enamel they ascribe a chemical cause.

In 1870, Wedl verified part of Leber and Rottenstein's experiments, but considered acid essential to the disease. He believed caries to be due to abnormal secretions of the oral membranes and salivary glands ; and that in consequence of their fermentations, acids were formed which acted on the teeth.

In 1873, Tomes abandoned all idea of vital action as a part of caries, and regarded the calcification of the fibrils as doubtful.

In 1881, Underwood and Milles believed the disease to be due to micro-organisms ; also that previous experiments showing caries to be due to acids were void, because septic conditions prevailed.

In 1882, Miller, of Berlin, demonstrated that micro-organisms do not precede decalcification, but that they are the cause of the disintegrations of the matrix after the removal of the lime salts by acids.

Mr. Mossman, of Iowa City—from whose articles on Dental Caries, published lately in the *Dental Comos*, most of the above account of the history of the different theories has been taken—sums up as follows :—

The vital or inflammatory theory of caries, an inflammatory disease having a central origin.

The chemical theory recognised the existence of acids in the mouth and their capacity to dissolve the lime salts.

The chemico-vital theory is a combination of the two above mentioned. According to this belief the acids act upon the inorganic tissues ; the irritation is conveyed to the pulp, which reacts against the invasion of the disease by throwing out lime salt into the fibrils.

The parasitic theory. The enamel being removed by acids, the organisms penetrate the tubuli of the dentine and proliferate there, according to some writers, merely expanding the tubuli for the better penetration of acids, and, according to others, generating themselves an acid by their action upon the organic matter.

The chemico-parasitic theory. This gives to acids the first place, to their agency all decalcification is due. Following this process come the micro-organisms, which penetrate only when decalcification is sufficient to permit their advance. Then they are found in great numbers, and cause the putrefaction of the organic mass.

The chemico-putrefactive theory is the same as the above, save that the micro-organisms are only incidental to the putrefactive process, and have no part in the disease.

Messrs. Underwood and Milles describe the microscopical appearance of carious dentine as follows :—

" The tubes are filled with micro-organisms. They appear to penetrate the canals at first in single file, and then accumulate in vast numbers to encroach upon the matrix. Here and there a narrow line of bacteria or micrococci penetrate beyond the sphere of visible decay. Besides the disintegrated tissues and foreign particles, there is found abundance of leptothrix buccalis.

" The micro-organisms consists of micrococci, rod-shaped and oval bacteria, and short bacilli.

"The number of sections of carious teeth cut and examined is now so enormous, that observers feel justified in assuming that the presence of micro-organisms is indispensable to the process "—(Sewill). Acids are necessary for the primary decalcifications.

The sources of these acids may be referred to the processes of fermentation and putrefaction, which was continually going on in the mouth.

Fermentation requires the presence of a ferment, which may be either organised, that is, living, or unorganised. Living ferments grow and multiply at the expense of the matters in which they occur. Yeast may be cited as an example of the former, and dtyalin of the latter. Moulds, yeasts, and bacteria, are all met with in the mouth. They gain access to it from without (Ziegler).

The mucous secretion and the secretion from the salivary glands combine to form mixed saliva. All starchy or saccharine substances taken into the mouth are converted into grape sugar by ptyalin.

Grape sugar, when acted upon by a yeast, the torula, undergoes alcoholic fermentation ; the presence of the bacterium aceti induces acetous fermentation. Stomatitis and caries of the teeth have been observed to be especially frequent in the case of chronic drunkards, and it is probable that beer drinkers suffer more from these affections than those who indulge in liquors possessing a larger percentage of alcohol. May not the acetous fermentation of the imbibed liquor cause these conditions? Another yeast, the myco-derma vini, transforms the alcoholic products of the first torula fermentation into acetic acid.*

Milk is taken as food, acted upon by the bacterium lactis, lactic acid is produced.

Putrefaction also requires the presence of a ferment, and we know that the bacterium termo is that ferment—(Ziegler). Naegleli, Pasteur, Lister, and others, regard putrefactive fermentation as the direct result of the vegetation of the bacteria. Bacteria, as they grow and multiply, withdraw from the nutrient liquid the elements they require for building up their cells. These are chiefly C. H. O. N. from carbohydrates and albuminoids. The necessary inorganic compounds are derived from salts containing sulphur, phosphorous, magnesium, and potassium. None of the bacteria can develop without water—(Ziegler).

When albuminoids undergo decomposition, we have formed formic, *acetic*, butyric, valerianic, caproic, and *lactic* acids ; combined with ammonia, or other organic alkalies, leucin and tyrosin, sulphuretted hydrogen, carbolic acid, and various other substances. When proteids are entirely decomposed there remains a substance rich in fats, in earthy and ammoniacal salts, phosphates, and nitrates. (Rutherford).

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* Naelgeli maintains that the torula and the myco-derma are not distinct species, and, according to Grawitz, the white patches, known as thrush, are due to the presence of the myco-derma, the mycelial filaments and spores of which are distinguished as belonging to the Oidium Albicans. (Ziegler.)

In hyperæmia of the mucous membrane, there is an excessive secretion of mucus. The chief constituent of mucus is mucin, an albumoid substance, readily splitting into a number of simpler bodies. Animal substances are taken as food into the mouth. These are principally composed of albuminoids and fats. One of the products of their decomposition is lactose, which breaks up into lactic acid.

We may say, then, that putrefactive fermentation may be set up by the action of bacteria on the mucous secretion, either alone or along with remains of food. When the mucus is extremely viscid, it may determine the location of caries by causing the adhesion of food, &c., to particular surfaces.

In the two processes of fermentation and putrefaction, two acids—acetic and lactic—are formed. These both act powerfully on the teeth.

According to Leber and Rottenstien's experiments, a solution of acetic acid of the strength of 1 in 1000 decalcified in 17 days the enamel and adjacent dentine of a tooth placed in it ; a 10 per cent. solution of lactic acid showed during the same time, a very decided action on another tooth. It is probable, then, that acetic and lactic acids, along with other acids, produced in the putrefactive decomposition of albuminoids, dissolve the lime-salts of the dental tissues.

Miller, of Berlin, states that micro-organisms are never to be found in any but decalcified tissues of the tooth, and this is probable, as bacteria cannot live without water, and it is difficult to believe that they can go on in advance without it.*

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*Drs. Leber and Rottenstien, who. in 1877-78, published their researches on origin of caries through the action of leptothrix buccalis, differ from Miller.

There is, they say, no manner of doubt that the elementary parts of the fungus penetrate into the interior of the canals, and there develop in a manner to acquire a relatively considerable diameter.

It also results from the very fact of the dilatation of the canals, that the appearance of the fungus is not accidental, and that it is not by a turely passive action that it invaded the canals. It is necessary that phere be a proliferation of spores infinitely minute and innumerable of

We may, therefore, conclude that they await decalcification. When the dentine is reached, channels are hollowed out to admit the fluid collecting in the cavity behind. In this float the organisms, deriving nourishment partly from it and partly from the disintegration of the organic matrix, by this means producing, and setting free, the acids of putrefactive fermentation to continue the process indefinitely.

The exclusion of water, as a means of stopping the invasion of caries, has long been recognised, and the energies of successive generations of dentists have been devoted to the application of water-tight fillings.

We may conclude, then, that the secretion of the mucous membrane takes part in certain fermentative and putrefactive processes, when in sufficient quantity, either alone or in combination with saliva or foods. That micro-organisms superinduce putrefactive decompositions of albuminoids ; that such processes produce acids which act by decalcifying the dental tissues, and so make way for the micro-organisms found by Miller and others. That these organisms, by removing certain constituents of the organic matrix of the dentine, produce putrefaction, and consequent disintegration. That the locality of caries may be determined by the collection of organic matter on dental surfaces, coated with viscous mucous.

The section on pathology has been largely taken from Ziegler's Pathological Anatomy. I have also referred to the following works :—Salter—Dental Pathology and Surgery. Harris—Principles and Practice of Dentistry. Wedl—The Pathology of the Teeth. Tomes—Dental Surgery. Tomes—Dental Anatomy.

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the fungus to effect the dilatation of the tubules. It is, moreover, very important that the elements of the leptothrix should have, at a certain stage, a mobility of their own, in virtue of which they easily penetrate the interior canals. As for the rest, we have met in the canals with only the granular masses of the leptothrix, and never the filaments which appear to show themselves only at the surface. [The granular masses are probably only the disintegrated tissues.—E. A, C.]

NOTE ON THE CHANGES IN THE TEETH IN LOCOMOTOR ATAXY.

ABSTRACT OF A CLINICAL LECTURE BY DR. GALIPPE.

In 1882, referring to some observation, published by Dr. Demange, of Nancy, on the spontaneous falling out of the teeth in locomotor ataxy, I ventured to express some doubts on the exclusive part attributed to this affection.

The lesions which have been found to affect the trigeminal nerve and the functional disturbances that may result from them, appear to me to be far more of a nature to prepare a special soil, by which I mean to favour the development of an affection known by the name of alveolo-dental osteo-periostitis. This affection, which I have studied in conjunction with Mn. Malassey, is caused by the presence of a parasite Its chief characteristics are the loosening and falling out of the teeth, accompanied by more or less profuse suppuration, and the destruction of the edge of the alveolus. In many cases the alveolar border is cast off in pieces of more or less considerable size, but repair occurs very rapidly ; that is not, however, always the case in locomotor ataxy, as we shall see presently.

My doubts have been confirmed by the examination of the mouths of about a hundred ataxics, in the wards of Messrs. Debove, Raymond Landouzy, Luys and Charcot.

The clinical sign we observed are so nearly allied to those observed in alveolo-dental periostitis, that we should have found it quite impossible to come to a definite diagnosis by the examination of the lesions alone.

We have, however, a certain means of comparison between these different lesions, one by which we can either separate or identify them.

In cases of alveolo dental periostitis, Mn. Malassey and I have found parasites which have invaded the teeth through the cementum.

It is quite evident that, if in locomotor ataxy, the loss of the teeth, which is far from being an absolute rule, were to be attributed solely to trophic changes, we should find no parasites in them. The opposite condition would show that the cause of their falling out is very closely allied, if not identical, with those met with in alveolo dental periostitis.

Though patients suffering from locomotor ataxy often lose their upper teeth, it is very difficult indeed to get any, whether it be that they are swallowed or that the patients do not draw the attention of their medical attendants to this accident. I have been obliged to wait for a very long time before being able to verify the truth of my hypothesis. Thanks to the kindness of my colleague and friend, Mn. Malassey, I have at last been able to obtain some ataxic teeth which had been shed spontaneously. The well-known skill and knowledge of my friend of this form of disease puts any doubt about the diagnosis out of the question.

The examination of these teeth by the method I had already adopted with Mn. Malassey for the examination of teeth which had been lost in consequence of alveolo-dental periostitis, led us to the same conclusion. The teeth shed in cases of locomotor ataxy are invaded by parasites. My master and friend, Mn. Malassey, has had the kindness to examine my specimens and to give me all the technical advice I required.

The microscopic examination alone is not enough to separate the lesions or the parasites from the corresponding ones met with in alveolo-dental periostitis. Cultures are the only certain means of arriving at a definite diagnosis.

The fact, however, remains established. It shows that it is a perfect mis-use of words to say that the teeth which are shed in cases of locomotor ataxy are perfectly healthy.

The shedding of a tooth cannot possibly take place without some lesions of the cementum, for the ligamentous bundles which keep the tooth firmly fixed to the maxilla penetrate into the cementum, and they cannot possibly be destroyed without some pathological process of some moment.

I have never been able, in the many cases of ataxy which I have examined, to observe any of the specific lesions of the teeth which some few writers mention.

Dr. Galippe also records a case of ataxy, in which he was obliged to apply some form of apparatus, owing to a perforation of the antrum on either side.

STUDIES OF THE PATHOLOGY OF HUMAN TEETH, WITH SPECIAL REFERENCE TO THE ETIOLOGY OF CARIES.*

By Frank Abbott, D.D.S., New York.

One of the most important questions in dentistry has always been the pathology and etiology of caries. Thoughtful dentists have long agreed that there is a marked difference, not only of individuals, but also of races, in the liability of teeth to decay. Quite recently a prominent dentist of New York directly accused civilisation of being the most conspicuous factor in its production. It is an undeniable fact that, with advancing refinement of individuals and nations, decay of teeth is more prevalent. It seems to me, however, that even this recognised fact will not altogether explain the rapidly growing tendency toward this disease under all circumstances. It has many times occurred to me that there must be an anatomical substratum to fully explain the liability to caries in each single individual, aside from the acquired local causes to which caries has usually heretofore been attributed. Unquestionably, there are auxiliary agents in producing or fostering decay of teeth, such as certain kinds of food, more especially sweets, which are too often retained in the fissures always found in the grinding surfaces of certain teeth, upon irregular teeth, uneven surfaces of the enamel, etc. But all these cannot fully explain the fact that the simple change in modes of living should manifest itself in the sudden and rapid destruction of these organs. Strong, healthy individuals, upon being transferred from a country of high refinement, may soon become victims of caries of their teeth. Modern Germans and Irish, immigrating to America and enjoying luxuries (similar to those enjoyed by comparatively civilized old Egyptians, in whose mummies we observe, not without some surprise, a pronounced tendency toward decay of the teeth) soon discover, to their great discomfort, at least, that their teeth are becoming diseased.

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* Read before the American Dental Association, and reported in the *Transactions*.

With these questions in mind, I undertook to examine a large number of teeth which had been ground into thin slabs, with the precaution of preserving their soft parts, especially their living matter, a method first introduced into microscopic technique by Dr. C. F. W. Bodecker. The results of my observations, though not exhaustive, are highly satisfactory inasmuch as they explain, quite positively the tendency of certain teeth to decay, the cause of which is in direct relation to and dependent upon imperfections in their anatomical structure. I claim, based upon these observations, that certain deficiencies in the minute structure of the enamel must be directly considered as playing a most important part in the etiology of caries.

Before entering upon the description of the anomalies of enamel which I have discovered, I wish to briefly recapitulate the description of the structure of this tissue, and its relation to dentine, as first discovered by Bodecker, in his essay entitled "The Distribution of Living Matter in Human Dentine, Cement, and Enamel." (*Dental Cosmos* 1878-1879). According to this observer, the enamel is composed of rods and fibres of a slightly wavy course, interlacing between which delicate interstices are left. In these interstices run delicate fibres of living matter, sending minute offshoots in a prevailingly vertical direction into the enamel rods, thus producing the cross-lines long since known to exist in the enamel-rods, but shown by him to be far more delicate and numerous than ever described before. The square-pieces of the enamel-rods are again subdivided into minute fields ; they are separated from each other by delicate, light interstices, and in all probability contain fibrillæ of living matter. Thus the enamel is raised to the dignity of a living tissue, in place of the former conception of its being a mere calcareous deposit. At the place of junction of the enamel with the dentine a direct connection is often seen between the enamel and dentine fibres. More commonly dentinal fibres run into the enamel varying distances, without a direct union between them and the enamel-fibres ; as the latter do not generally reach the surface of the dentine, but terminate above its level at different heights, while the zone close above their terminations is occupied by a delicate irregular net-work. In many places the dentinal canaliculi, upon entering the enamel, suddenly become enlarged and form spindle or pearshaped cavities of varying diameters. They invariably contain protoplasm which is in direct connection with the terminations of the dentinal fibres, and on their periphery with the fibres of living matter of the enamel. In the teeth of young persons the spindle-shaped enlargements are comparatively larger and more regular than in the teeth of old people. The boundary line between the dentine and the enamel is usually slightly wavy and with more or less deep, bay-like excavations, the concavities of which are directed toward the dentine.

I.—Anomalous Relation between Dentine and Enamel.

In examining a large number of specimens of ground teeth, I met with formations in two instances which are to be considered as rather anomalous, though not strictly pathological. In one instance, that of a temporary molar, there was on the buccal surface a protrusion of dentine into the enamel with a fluted surface, which was produced by a series of bay-like excavations, present also at the junction of the dentine with the enamel in this tooth in general, but not so marked as in this protruding spot. The centre of this protrusion was occupied by an eccentric protoplasmic formation, differing in shape from the ordinary interglobular spaces. The dentinal fibres at the periphery were bifurcated in the usual manner, but very few of them penetrated the enamel. The portion of the enamel nearest to the protrusion was destitute of prisms, while in the immediate vicinity such prisms were traceable almost in contact with the dentine. The zone immediately above the protrusion was but slightly brownish, whereas the prisms of the enamel exhibited a very distinct brown pigmentation.

In a second case, that of a permanent cuspid, also on the buccal surface near the edge, a protrusion of dentine was observed, occupying nearly one-half of the breadth of the enamel. This protrusion was of a conical shape, and without a distinct boundary, but blended with an oblong field of enamel of quite remarkable structure. The dentinal canaliculi exhibited at their peripheral portions numerous bifurcations, and terminated in small pear-shaped enlargements, many of which could be traced in connection with dentinal fibers, whereas the most peripheral ones, owing to their devious course, looked isolated. The adjacent enamel showed but very indistinct rods, the main mass of the enamel being occupied by brownish globular fields, separated from each other by irregular interstices closely resembling the interglobular spaces of dentine, though of considerably smaller size. The deepest pigmentation and the largest number of such *interprismatic* spaces occurred along the periphery of this anomalous formation, especially toward the outer surface of the enamel. The vicinity of the enamel proper was marked by the presence of slightly pigmented rods, more wavy in their course than normal. Toward the dentine the anomalous formation was sloping, and the line of demarkation between the normal and anomalous enamel exhibited either brown and very wavy prisms or small *interprismatic* spaces, decreasing in diameter the nearer they approached to the dentine. I wish to emphasize and call particular attention to the fact that the dentine of this tooth was nowhere traversed by interglobular spaces ; the anomalous construction being confined to the enamel.

II.---STRATIFICATION OF ENAMEL.

It is known that dentine, without exhibiting pathological features, is sometimes composed of strata, more or less distinctly marked, slightly deviating from its normal structure and altogether independent of the formations in the enamel. We observe layers varying in width and more or less sharply marked by a straight line, which in longitudinal sections of teeth exhibit concentric layers, the broadest portion always corresponding to the cusps, the narrowest always to the neck, of the tooth.

At the outer periphery of the enamel there may occur strata, which, contrary to the general construction as above described, are broadest toward the neck and narrowest toward the cusp, though never reaching its summit. In transverse sections the enamel shows simply concentric lines, separating from one another layers of greatly varying diameters. With higher powers of the microscope we ascertain the fact that the lines of stratification, as a rule, do not alter the general course of the enamel-prisms,—in other words, a single enamel prism will show an oblique line of demarcation, corresponding to the general line of stratification, without being altered in its construction or its course. An exception to this rule will occur only at the peripheral portions of enamel, occupied by the tapering ends of the above-described secondary strata, which I would like to term *neck-layers*, in contradistinction to the central *cusp-layers*. The tapering ends of the neck-layers may exhibit enamel-rods, almost parallel with the surface of the enamel, a feature which is never seen at the periphery of the cusp-layers, where the enamel-rods are invariably directed more or less vertically to the surface.

The stratification of the enamel is of the utmost importance for the understanding of its pigmentation and granulation. As I will show later on, both the pigmentation and granulation correspond to the general strata of the enamel, thus showing in longitudinal section of teeth a fan-like appearance.

It can scarcely be doubted that the stratification of this tissue is in close relation to the history of its development. We know that the first appearing enamel-cap of temporary teeth, in the seventh month of intra-uterine life, has the configuration of the innermost cusp-layer,—i. e., it is broadest in the direction of the future cusp, and tapers towards the future neck of the tooth. It seems reasonable to assume that the subsequent layers of enamel form on the plan of the first, but there may be a temporary stoppage of its construction, due perhaps to slight ailments of the mother before delivery of the child, or slight ailments of the infant after delivery, which causes interruptions in its organization. Slight ailments of a general nature will not interfere with the final result of an otherwise sound enamel ; whereas severe ailments particularly local, may lead not only to stratification, but to a decidedly pathological condition, which I have before called pigmentation and granulation. These conditions invariably involve a deficient deposition of lime-salts.

III.—ANOMALOUS ARRANGEMENTS OF THE ENAMEL-RODS.

In normal enamel longitudinal sections will, in the majority of cases, exhibit slightly wavy rods, interlaced by comparatively small bundles, cut in a transverse direction. Toward the periphery the curvatures of the rods gradually become less, until when close to the surface they present a nearly straight course. I have never seen transverse sections of enamel-rods directly in contact with the interzonal layer.

Deviations from this rule seem to be rare, and then the enamel-rods seem to lack all regularity in their arrangement. It may occur that close to the interzonal layer the enamel-rods show extensive fields occupied by these transverse sections, which gradually blend with oblique and longitudinal, producing a wavy appearance, to such an extent that beautiful figures arise, reminding one of the grain of *lignum-vitœ.* Still more complicated figures arise if the transverse bars of the longitudinal rods are unusually conspicuous. In such enamel it may occur that the curvatures of the rods remain very marked up to the surface; and consequently groups of transverse sections may be seen directly at the outer surface.

(To be continued.)

Reflections from the Surgery.

TOOTH-PLATE IMPACTED IN THE ŒSOPHAGUS; SUCCESSFUL REMOVAL BY ŒSOPHAGOTOMY; REMARKS.

(Under the care of Sir WILLIAM MAC CORMAC.)

It is now generally conceded that the treatment of foreign bodies impacted in the œsophagus, where unsuccessful attempts have been made by the use of forceps, &c., to extract them, should be by an operation—œsophagotomy,—as in the following case. Here the plate with very irregular and pointed projections had become fixed, and resisted all attempts to remove it. The operation has been a very succesful one when undertaken before the advent of inflammation or suppuration about the œsophagus; the chief danger appears to be in delay. The point in the treatment to which

Sir William draws attention in his remarks (the closure of the œsophageal wound by suture) is one which will probably be generally adopted in similar cases, as it presents considerable advantages. The notes of the case have been taken by Mr. Cameron Kidd, house-surgeon.

The subject of this accident was a woman, aged thirty-one, of healthy appearance, but subject to epileptic fits from childhood. During one of these fits, which took place on Sunday morning, March 14th, the patient swallowed a set of artificial teeth, consisting of a silver plate to which five teeth (four incisors and one premolar) had originally been attached, but one of these (the premolar) had been broken off some time before the accident occurred. When the patient regained consciousness she had some difficulty in breathing and swallowing, and then discovered what had happened. She immediately consulted a doctor, who gave her an emetic, which caused her to vomit without moving the plate, and an attempt to extract them with forceps was made without success. She was then advised to apply at St. Thomas's.

On her arrival at the hospital two hours after the fit, there was no difficulty in breathing, but there was considerable pain on drinking. An œsophageal bougie, carefully passed to ascertain the position of the foreign body, became arrested at a point six inches and a half from the edge of the teeth. The patient said she could feel the tooth-plate from the pain it caused, which she referred to a spot an inch below the cricoid cartilage. The surgical registrar made repeated and prolonged efforts to extract the foreign body by means of œsophageal forceps of various kinds. The plate was repeatedly grasped by the forceps, and as much force used as was thought justifiable, but all attempts to disengage it failed. Some slight hæmorrhage followed. During one attempt half a tooth was broken off and was extracted. The plate was evidently flattened against the posterior wall, as the forceps went past it, and it could only be grasped when they were withdrawn a short distance and passed again with the blades open. The patient, who was admitted on March 14th, was seen by Sir William MacCormac at 7 P.M., but as there was no dyspnœa or other urgent symptom, it was decided to postpone any further action until the following day.

March 15th.—The respiration is quite easy, but the patient cannot swallow anything, even a small quantity of liquid, and she expectorates the saliva. She complains of severe pain just below the cricoid cartilage, and at the back of her neck. There is some cough.

Operation.—As every possible effort had been made to extract the body by the mouth without success, further attempts in this direction seemed unadvisable. The plate was of very irregular form, with sharp angular projections at each side. It was evidently very firmly lodged in the tube, and was not likely to be extracted without danger of tearing the œsophagus, entailing very serious risk. Sir William therefore decided to perform œsophagotomy, the position of the foreign body being distinctly made out by the bougie and forceps, although nothing could be felt in the neck externally. At 2 p.m. the patient being under the influence of chloroform, the œsophageal forceps was passed and the foreign body again plainly felt at the same point as before. An incision about four inches long was therefore made along the anterior border of the left sterno-mastoid muscle, extending downwards to within half an inch of the sternal notch. The superficial tissues were divided until the edge of the sterno mastoid muscle was reached, and the edges of the wound retracted. The anterior jugular vein, which was somewhat larger than usual, gave some trouble at this point, but was finally drawn inwards with the thyroid body. Several veins required division after the application of a double ligature. The carotid sheath was exposed, the omo-hyoid muscle cut through, and the artery and vein drawn outwards by the finger of an assistant. After dividing about half of the sterno-hyoid muscle and drawing the thyroid body well over towards the middle line, the œsophagus was exposed, but even then the foreign body could not be felt through its walls. It was feared it might have passed into the stomach. The forceps were again passed through the mouth, but even with them the foreign body was not distinctly felt. As, however, probabilities were strongly in favour of it not having shifted from the position it occupied before the operation, a longitudinal incision about three-quarters of an inch long was made upon the end of the forceps, and when the lips of the incision were held apart the plate was at once seen closely impacted against the posterior wall of the œsophagus. It was readily seized with a pair of forceps and extracted without difficulty. It was now decided to close the œsophageal wound. An ivory-balled probang was passed to cause the tube to project somewhat, and the edges of the incision were united with three catgut sutures. The external wound was disinfected with a 1 in 1000 perchloride of mercury solution. Two drainage-tubes were inserted, and the margins of the skin united with silk sutures. There was very little bleeding throughout the operation. The wound was dressed with iodoform, salicylic wool, and gauze bandages. The patient was ordered to be fed by the rectum, and not to have anything by the mouth.

March 16th.—On the wound being dressed this morning, it looked well and there was no puffiness. Patient had a nutrient enema at 12 a.m., and a similar one has been ordered every four hours. She has taken nothing by the mouth, and expectortates her saliva. Slept well; no pain. The temperature rose after the operation to 101°, and is now (9 a.m.) 100·4°; at 9 p.m. it was 98·4°.

18th.—The stitches were taken out and the drainage-tube removed. The wound was looking very well. The patient could now swallow her saliva and she was allowed a little milk, which she swallowed easily and without any pain. Nutrient enemata discontinued. Temperature A.M. 99·4°; P.M. 100°. There has been no regurgitation through the wound.

20th.—Last evening some milk came through the wound after drinking. The patient did not mention the fact till this morning, as she was afraid her supply of milk would be stopped. She is a restless, irritable woman, and dislikes the feeling of thirst. On taking off the dressings and giving the patient milk to drink, some came out of the lower end of the wound, which was perfectly free from inflammation and had healed, except at the spot above and below where the drainage-tubes had been placed. The nutrient enemata were ordered as before and the supply by the mouth stopped. Antiseptic pressings left off. Temperature normal.

22nd.—Wound again dressed ; it was looking quite well. On drinking hastily, a little milk came out from the lower end of the wound ; a small drainage-tube was inserted there. The patient was still allowed to drink milk. The nutrient enemata were discontinued. Temperature, morning, 99° ; evening, 92°. General condition excellent.

25th.—The wound is now soundly healed, with the exception of a small place at the lower extremity. No milk has passed through it for the past twelve hours, not even when the patient swallows quickly. Drainage-tube removed.

27th.—Wound completely healed. The patient had an epileptic fit at 4 o'clock this morning.

30th.—The patient was up on the 28th, and went home to-day. There is a linear cicatrix in the neck, scarcely noticeable. She can swallow as well as before, and without pain or inconvenience, even when taking solid food.

The patient was seen about a month later, and was in excellent health. She had been supplied with a new and securely fitting plate.

Remarks by Sir William MacCormac.—This patient was only sixteen days in hospital, having made a rapid recovery. The point of chief interest is the closure of the œsophageal incision directly after the removal of the plate. The introduction of the sutures was a little troublesome owing to the depth of the wound, and I consider the partial failure was due to imperfect closure of the incision, from an insufficient number having been passed. Had four or five sutures been introduced in place of three, this accident might probably have been avoided. The milk, however, only found its way into the wound on the sixth day, when the chance of extravasation into the cellular tissues of the neck would be past, and it soon ceased to escape. This practice appears preferable to introducing a tube into the stomach from the neck or mouth and allowing the wound to heal by granulation—at all events in cases such as this one, where there were no inflammatory changes in the parts, and the margins of the œsophageal wound were clean cut, and not bruised.

British Journal of Dental Science.

LONDON, JULY 1, 1886.

PHOTOGRAPHY IN DENTISTRY.

There are many pursuits which are capable of affording amusing, healthful recreation while they subserve useful and instructive purposes. Photography is one of these. An invention of very old standing, it has only within the past few years been brought to any degree of completeness. But as the details of the art of photography were worked out, its processes simplified, its range of application became more wide and further it became the chosen pastime of amateurs. Landscape photographing has become a favourite occupation for the Autumn holiday and not a few dentists have attained great skill in the production of pictures of this nature. The application of photography is however capable of extension far beyond the scope of the fine arts and has been pushed into the service of science. Records of cases, surgical, medical, dermatological and dental have been obtained by photography and from their exactness and precision have proved most valuable. It happens so commonly that the use of the pencil and brush has not been acquired in early life and the pressure and hurry of a busy life prevents a man from even attaining a medium dexterity in after years so that for lack of some means of establishing a graphic note of cases of interest much valuable material, whether of interest to the pathologist or teacher or student, becomes lost. Here then photography shows itself conspicuously of use. The man whose occupation makes him skilled with his hands and fairly conversant with drugs, is already partly trained for the manipulation needed for successful photography and so starts upon the art with a considerable advantage over others. It may be said truly that dentists would as a rule find but little difficulty in acquiring considerable success in this accomplishment. But it may be said will the initial outlay in defraying cost of materials, will the time expended in attaining precision and accuracy in preparing negatives, will these be commensurately compensated by the advantages accruing ? Were photography simply pursued as a holiday pastime, we should even answer in the affirmative, as we are sure the fresh interests acquired in the search for "likely spots" the habit of observation and the pursuit of the beautiful would be of the utmost service to any one and especially to the dentist whose eye should be trained to the contemplation of harmonies of form and colour. But photography is a valuable adjunct to the dentist's armentarium, in so much that it enables him to perfect the records he keeps of his uncommon cases. The prosthenic part of a dentist's work is especially applicable for the employment of photography. We may, however, advance the uses of this valuable art still further. Microscopic sections of diseased dental structures require explanation and are often almost unintelligable to persons who are not skilled microscopists. Now it is usual to make drawings from the slides, and the method is no doubt useful for demonstration purposes, but it is open to grave question, for the observer is very apt to suggest in his sketch what his eye desires his section should show. He is often more concerned in promulgating a theory than in exhibiting a fact, and so his pencil is guided by the bias of his preconceived idea. To obviate this drawback microphotography comes to our aid and establishes beyond question the exact portraiture of the microscope slide. Many questions rendered doubtful by the conflicting evidence of several observers are capable of solution by resort being had to this method. However, it seems hardly needful to say more upon this question. We have already pointed out special reasons for the general employment of photography by dentists.

His Grace the Archbishop of Canterbury has accepted the office of a Vice-President of the Dental Hospital of London, Leicester Square.

We publish the recent examination papers of the Royal

College of Surgeons of England. They will be found in the section devoted to Dental News.

PRIZE DISTRIBUTION AT THE NATIONAL DENTAL HOSPITAL.—Sir William MacCormac, F.R.C.S., D.Sc., distributed prizes to the successful students of this Hospital on June 22nd. The distribution took place at the Beethoven Rooms, Harley Street, and was followed by a well arranged musical soirée. Sir William MacCormac's genial manner and kindliness of nature render him a peculiarly happy choice for the post he so gracefully occupied. We trust the dinner, which takes place as we go to press, will be as successful, and then the National Dental Hospital will have nothing to complain of.

THE INTERNATIONAL MEDICAL CONGRESS.—"We" says *Items of Interest*, "have just received information through Dr. W. W. Allport and also through Dr. Wm. H. Atkinson, that the managers of this Congress have thrown open its doors wide to all physicians irrespective of schools. This throws to the dogs the only bone of contention that has jeopardized its success. We suppose it is also understood that in a like liberal spirit they have placed the Dental section entirely in the control of dentists, with instructions to admit to its benefits all reputable dentists whether M.D.'s or not. As Dr. J. Taft is the president of this section, we have a guarantee of both discretion and liberalism. We are glad to see that the honest difference of opinion amongst dentists which has heretofore existed is now giving place to harmony and good feeling with every assurance of a grand success." We hope that this is so.

GOUTY TEETH.—J. Milner Fothergill, speaking on the diagnosis of gout, says: There is little doubt that the configuration of the teeth was a distinct value. The teeth are solid, and, in the "Norse" type, massive. They are blunt and thick at the edges, and worn down. They have a great tendency to come out without any caries, but from an osteitis, extending from the neck along the fang to the root. The incisor tooth is more worn down than the canine or molar teeth are. The centre of the tooth-surface is also of dark colour. When the gouty person shows his teeth, their build and conformation are at once to be detected; while often the gum is seen retracted. Sometimes the front teeth of the upper jaw are very massive. Some years ago Dr. William Stewart took casts of the teeth of a number of undoubtedly gouty patients. One cast shows the teeth in a comparatively early stage. The are regular, well shaded, solid, if not large teeth, beginning to wear down distinctly on the surface. Such worn-down teeth, in my experience and opinion belong to gouty persons.

METAL DIES.—Mr. F. E. Sprague writing in the *Cosmos* says, "To prevent imperfections of or bubbles in the palatal portion of metallic dies, is is not necessary to dry the mould after it is formed, or to use more than ordinary precaution as to the heat of the metal. I find the best result is obtained when the plaster model is quite thick and the mould consequently deep. This is then tipped forward, raising the back part or condyles to the highest point possible ; pouring the metal in at the front slowly, and lowering the mould at the same time until the palatal portion is covered, and the mould filled to the top. I have advised the above in many cases, and have not yet seen a failure.

HEAT OF RUBBER PLATES.—EXTRACTING TEETH FOR PLATES.—Dr. Wm. H. Morgan wishes to notice two fundamental errors. The damage done the mouth by rubber is attributed to excessive heat. This is a mistake. The mucous membrane does not eliminate heat ; it cannot get above blood-heat, unless there is inflammation; it cannot eliminate enough heat to raise the temperature of the mouth above that of the body. The idea of abnormal heat is a wrong impression. There is always irritation and inflammation preceeding abnormal heat. We must go back of that for the production of loose tissues in the front of the mouth. Again, it is said all the natural teeth should be removed that would interfere with the artificial denture. The contrary should be the rule. The comfort and the utility of the natural teeth should be considered, and the plate made to conform to them. We are indebted to *Items of Interest* for the above.

Abstracts of British & Foreign Journals.

THE INDEPENDENT PRACTITIONER.

SOME THOUGHTS AND EXPERIMENTS UPON EROSION.

By Edgar D. Swain, D.D.S., Chicago, Ill.

Aiming to secure, as near as possible, the acidity detected in the oral secretions, when present at all, he procured ten small glass vessels, and cemented two teeth to the bottom of each, crowns up; also with them a piece of copper wire. These were then filled with the acid solutions, covering the teeth, so that about one-half the enamel was submerged. Each glass was then covered with a sheet of paraffine paper, tightly bound to it, to prevent evaporation and exclude the dust. These vessels were placed upon a shelf built against a chimney, warmed by a continual fire. The temperature of the oral cavity (98° F.) was maintained. From time to time, as necessary, the acids were tested with litmus, and replenished to preserve a medium strength and quantity.

The experiment was conducted from May until October with the following results:—

Oxalic Acid—Strength, $\frac{1}{260}$ of one per cent. No action upon teeth or wire.

Citric Acid—Strength, $\frac{1}{180}$ of one per cent. No action.

Phosphoric Acid—Strength, $\frac{1}{130}$ of one per cent. Slight roughening of all that part of the enamel immersed. No apparent action upon the cementum. Wire slightly constricted at the line of immersion.

Lactic Acid—$\frac{1}{60}$ of one per cent. Marked groove, and softened enamel at the line of immersion.

Acetic Acid—Strength, $\frac{1}{60}$ of one per cent. No action.

Butyric Acid—Strength, $\frac{1}{30}$ of one per cent. No action.

Tannic Acid—Strength, $\frac{1}{30}$ of one per cent. No action, but a slight brownish color of cementum.

Tartaric Acid—Strength, $\frac{1}{260}$ of one per cent. No action.

Sulphuric Acid—Strength, $\frac{1}{130}$ of one per cent. Enamel roughened over its entire surface; more so beneath the liquid. Light deposit of sulphate of lime above the immersed part. Cementum softened; wire constricted at the line of immersion.

Nitric Acid—Strength, $\frac{1}{130}$ of one per cent. Enamel roughened over its entire surface. Cementum not visibly affected. Wire eroded over its entire surface, but more so just above the surface of the liquid, where in contact with the atmosphere.

Hydrochloric Acid—Strength, $\frac{1}{140}$ of one per cent. Entire enamel roughened. No apparent action upon the cementum. Wire constricted at the point of contact of liquid and atmosphere.

The results of the previous experiments were very marked, and were only made, as were Mr. Bridgman's, with sulphuric acid, and that of a strength far greater than those used and reported above. In fact, the strength was sufficient to assure us, not only action upon the metal used, but also upon the lime salts of the teeth.

These last experiments have had a tendency to shake the writer's faith in the theory that electro-chemical action is responsible for the conditions we observe upon the teeth, known as erosion.

He is now satisfied that erosion is not a result of electro-chemical action, neither is it to be attributed to mechanical forces. The use of the tooth brush cannot be a cause where it has never been employed. The uses of acid fruit, or acids with our food, sudden changes of temperature, and all the other theories of this nature must be abandoned, and new theories sought for.

The writer joins issue with Magitot believed infantile convulsions (eclampsia) to be a common cause of erosions.

Hutchinson believes syphilis to be responsible for this disease, but here again we meet the same objections, reinforced by the knowledge that syphilis is a continuous disease, and if it be inherited and the teeth afflicted thereby, it would involve the entire organ, from formation of the enamel cap to the completely developed tooth.

In fact, circumstances do not warrant us in assuming that any disease causing an arrest of development would leave the tissues in such a condition that, if a central incisor be affected across the middle of its crown horizontally, five or six years later other teeth, say the cuspids or bicuspids, would be similarly affected.

In a recent conversation with Prof. Black, he said :—"I do not consider erosion a species of caries, as some have suggested, but do believe it to be the result of abnormal secretions, from glands situated in the lips and tongue, at the points of contact with the teeth." The lips touch most forcibly the highest point of the convexed surface of the teeth, leaving above that point of contact a pocket. The glands of the lip at point of contact may become closed, and consequently a low condition of inflammation exist, causing abnormal secretions. This, however, will not account for the disease upon the lingual surface of the superior incisors, and I have never yet seen a case of erosion upon the lingual surface of the inferior incisors.

Erosion is probably a result of combined conditions, and we are not justified in attributing all cases to any one apparent cause.

AQUA CALCIS.

By George J. Friedrichs, M.D., D.D.S.

The writer considers the utility of administering simple, plain limewater in order "to harden and reconstruct poor, soft, chalky teeth." Magitot asserts "that the nature of drinks used by populations play, as we have before hinted, but a secondary role, or is perhaps nil." And in the words of Prof. Truman : "The fact that hens must be occasionally fed on lime in order that shells may be formed, cannot be regarded as adding any strength to the argument in favor of lime assimilation. The shells of eggs cannot be held as organized products, and hence they bear no more relation to the hard tissues of the animal organization than a calcareous deposit in the mouth resembles the tooth upon which it is deposited. That increased density can be effected by the presentation of food containing the necessary elements, there can be no doubt, but that it can ever be accomplished by direct administration of the inorganic, is impossible. Careful observation, though a series of years, in lime-water districts, leads to the conclusion that assimilation cannot be carried on in this way, and that it is waste of energy to do so."

Dr. W. C. Barrett says: "Corroborative evidence, when looked for with biassed judgment, was not lacking, and dentists had tales to relate of the most stupendous changes effected in the development of children through a judicious administration of the lacto-phosphate of lime to the mother during pregnancy. The instances in which such results seemed apparent were cited, while those in which no effect resulted were not included in the category, or were attributed to a want of faithfulness in taking the prescription. We believe that which we desire to believe, and there is no difficulty in finding apparent confirmatory evidence to sustain the most absurd postulates when one sets out with the determination to do so."

And again: "Any man, or pregnant woman, who lives upon almost any diet that is sufficient to sustain life, will, if the nutritive organs be in proper condition, find more than is necessary of these elements (*i.e.*, lime-salts) to keep the osseous system in good condition." After giving some of the physiological reasons why the administration of the earthy phosphates for nutritive purposes must be a mistake, he concludes by stating: "If they act at all, it must be remedially, and if they are used they should be intelligently prescribed, like any other agent, and only for their medicinal properties. I have no knowledge that they have any very decided medicinal virtues, and, therefore, can see no excuse or dispensing such inert compounds."

According to average dietaries for adults in full health, collected by Dr. Playfair (*Chemical News*, May 12th, 1865), about twenty grammes of mineral matter are daily introduced with the food; and so much testimony in support of these now universally accepted facts, sufficient to fill a volume might be collected.

Lime-water is a perfectly clear and transparent liquid, inodorous, and has a powerful astringent and somewhat alkaline taste. It changes vegetable blues to green. It is not a caustic, but has a powerful astringent and styptic effect; hence, even in overdoses, it never disorganizes the animal tissues. Its astringency controls secretion. When absorbed it has a similar effect upon the glandular organs, diminishing their secretions in a remarkable degree.

Therapeutically, it has been prescribed for a variety of ailments. In 1739 the British Parliament decreed a national recompense of £5,000 sterling to Mrs. Johanna Stephens for her lithontriptic remedy, which consisted of egg-shells, soap, and several aromatic bitters. This preparation, however, was found so nauseous and so distressing to the stomach that various substitutes were proposed for it, among which the most simple was lime-water.

Nutrition is a tissue-function; the act of this process is the appropriation from without of the materials which enter into the composition of the living frame, or of others which may be converted into them in the interior of the body. The tissues may be bathed or saturated with the lime-salts, but if they be not taken up or appropriated their presence is of no value.

Lime-salts are very efficacious in neutralizing the acidity of the fluids of the mouth. It is an excellent astringent in flaccidity and sponginess of the gums, preventing putrefaction, and by its mild stimulation inducing a healthy reaction of the general tissues of the oral cavity, in this manner removing the external causes of caries, and thus preventing the progress of decay of the teeth.

If the administration of lime-water is efficacious in hardening decalcified teeth, it ought to be a specific in rachitis; yet we find that its administration in combination with milk is only occasionally beneficial.

ZAHNTECHNISCHE REFORM.

A CURIOUS CHRISTMAS BOX.

The relater of the following amusing incident was once visited by a former colleague who asked how he could give his wife a set of artificial teeth on Christmas Eve without her knowing he was going to do so until the presentation.

The friend assured him that if his wife had but one hollow tooth, he could easily obtain an impression without her knowledge.

Accordingly the lady, who was suffering from toothache, was brought by her husband to consult his dentist friend. After examination the latter told the lady he could relieve her from any further pain, but in order to get the stopping properly prepared he would be obliged to make a wax impression of the tooth he was to stop.

The lady was alarmed and thought this would be a very painful operation but consented to submit when her self-sacrificing husband promised to be experimented on first by way of re-assuring her.

The following day the lady again appeared, alone this time, and requested the dentist to make artificial teeth for her husband, to replace those he had lost. She also wished to know if he could do so without her husband's knowledge as she particularly wished to give them to him as a present on Christmas Eve.

Just before the festival the two packets containing the teeth were sent off, that with the lady's teeth was taken through the post to the business office of the husband, while the other was addressed to the lady at their private residence.

The evening came and with it the double surprise.

Some days after the husband visited his friend and assured him that he should never as long as he lived forget the amusing and astonishing exchange of presents which had taken place on Christmas Eve.

CORRESPONDENZ BLATT FUR ZAHNARZTE.

ON THE DURABILITY OF HERBSTS FILLING.

By Dr. Elof Forberg, Stockholm.

Herbst's method of filling it is stated is gaining popularity in spite of all opposition from those who hope to further their own ends or recommend their own methods. Many who have tested its advantages still require to be convinced of its durability. The chief peculiarity of this method is that an extraordinarily exact amount of filling is attained on the walls of the cavity and therefore it ought to be more durable. As a proof that it does so endure Dr. Forberg says that when he was in Bremen he met several patients who had long before had their teeth stopped by Herbst's new method. One man had had a great number stopped more than three years before and they were in perfectly good condition.

One young lady related that her upper central incisor had become perfectly black owing to unskilful treatment some years before. When she visited Herr Herbst four years ago he drilled the posterior portion of the tooth and removed a great part of the discoloured dentine so that the front part was visible and was filled with gold. This interesting case was very thoroughly examined by Dr. Forberg, and he found that the gold shimmered through the thin walls of the tooth and the joining of the filling was as perfect as possible. In no case did he find blue marks, all the fillings which showed an extraordinary durability, had the appearance of a set of artificial teeth. A youth of seventeen had had several teeth filled with gold in the course of six years and the fillings were all in the best condition. Herr Herbst filled seven teeth for Dr. Forberg about a year ago all of which give satisfaction with the exception of two, one on the distal side of a molar had a somewhat rough surface very irritating to the tongue. Although this fault might have been remedied in other ways the filling was removed to see if the cavity had been properly prepared to receive it. It was found perfectly cleansed so without any further preparation it was again filled. The second filling was the second upper molar on the distal side and had been filled nine years before in America, had become loosened, Herr Herbst had filled it again without having been previously told that during mastication the stopping pressed against the gum, therefore this again occurred and it was determined to remove the filling in order to examine the condition of the cavity. Professor Bodecker removed the filling, it was particularly hard. Professor Bodecker drilled in several directions, but the several pieces adhered firmly to the tooth cavity. Professor Bodecker was astonished at the durability of the filling and the excellent condition of the cavity, he said "no filling accomplished with the hammer would adhere so firmly." In consequence of these facts, although he had been opposed to the new method and did not willingly relinquish the use of the hammer, Dr. Forberg is convinced of the excellence of the former method. If any one should say the above cases are not numerous enough and not old enough to prove the durability of the filling, let him remember that only those cases were mentioned which were forthcoming in the course of a few days, and that the whole method has only been known for six years, and that these fillings have lasted from three to four years are perfectly unchanged although the method was then not so perfect as at present, therefore it seems that one need not fear for the durability of these fillings.

DEUTSCHE MONATSSCHRIFT FUR ZAHNHEILKUNDE.

SUDDEN BLINDNESS ARISING FROM DISEASED TEETH.

By Rudolph Skagsborg, Dentist, Stockholm.

The following case, though one of those often before described, possesses a peculiar interest on account of the remarkable rapidity of the cure.

In 1885, a peasant girl was sent to Herr Skagsborg by an ophthalmic surgeon with the request that he would examine her teeth. The girl had lost the sight of the right eye a short time ago, but as there was no abnormal appearance in the retina, nor elsewhere about the eyes, there seemed no way to account for the blindness unless it arose from the teeth.

The patient, Lotten Petterson, who was nineteen years old, stated that she became aware for the first time of a dark shadow before her right eye on the 30th March. This shadow gradually increased, so that by the 8th of the following April she was perfectly blind with that eye. At the same time, she suffered from violent headache.

The operator upon hearing her statement bound a thick bandage over her left eye, and, lighting a candle, moved it backwards and forwards in close proximity to the sight. The eye was quite unaffected by the light. The patient was perfectly blind with the right eye.

Upon examining the teeth, it was found that the molars and bicuspids both in the upper and lower jaw were utterly destroyed on both sides, some from periostitis, others from abscesses. These teeth and their roots were all extracted on April 14th. On the 18th April the patient began to see slightly, and on the 23rd she was able to tell the time from looking at a watch, and on the 25th, the eleventh day after the beginning of dental treatment, she was able to read the smallest print.

The whole treatment lasted twenty-seven days. The joy of the patient can be better imagined than described. Some diseased teeth on the left side were afterwards removed to prevent any similar trouble with the left eye.

Review.

ON CANCER OF THE MOUTH, TONGUE AND ALIMENTARY TRACT, THEIR PATHOLOGY, SYMPTOMS, DIAGNOSIS AND TREATMENT.

By Frederic Bowremann Jessett, F.R.S.C., Eng.,
Surgeon to the Cancer Hospital, Brompton.
London: J. and A. Churchill.

Although the literature which deals with cancer is very wide indeed, yet there exist few works which, like the present one, deals with the cancerous growths which are found in particular regions, and still less numerous are those which undertake, within the modest scope of three hundred pages, to set forth the salient features of so extensive a subject.

Mr. Jessett writes rather as a surgeon than as a pathologist, and handles his subject almost entirely from a practical point of view. He is daily brought face to face with cases of cancer, and so he desires to be able to diagnose his cases and to deal with them satisfactorily when his mind is made up about their nature. Like many other practical men he has learnt the many difficulties which beset the practitioner and student, and so he aims at imparting in plain language the best methods for diagnosis and treatment. The plan of the book is simple and excellent. Commencing by dealing with the cancers which invade lips, gums and oral structures in general, and to which are devoted no less than five out of eleven chapters. Mr. Jessett deals with cancer in the œsophagus, in the stomach, in the intestinal canal, and discusses in a separate chapter rectal and anal carcinomata.

A distinct feature of the book is the concluding forty pages, which are devoted to the recital of more or less typical cases.

In an introduction we are invited to consider the patho-genesis of carcinoma, but we confess that we are disappointed with a somewhat meagre account of so vast a subject. A well-arranged, even if brief, account of the natural history of cancer would have proved most instructive and could not fail to have borne practical benefit. It seems a pity that a writer who shows himself so well versed in the literature of the subject, as does Mr. Jessett, should have been induced to dismiss the patho-genesis so curtly. We look in vain for any reference to Creighton's classical researches, while the germ theory of cancer is dismissed with a reference to Mr. Harrison Cripps' opinion, omitting altogether the continental authorities on this point. When we turn to the more immediate subject-matter of the book, we have the more agreeable office allowed of according praise. To dentists especially, this work must commend itself as that portion of the human frame with which they are most familiar receives careful and, as far as space allows, thorough consideration.

Dentists are so often confronted with more or less serious mouth lesions, that a handy volume like the present one cannot but prove of great value to them. The account given of cancer as attacking the lips, tongue, and tonsils, is lucid and straightforward. Some care is given to the description of the various operative measures employed in plastic procedures for the restoration of the lips, *etcet*, after removal of epitheliomatous growths. Here the text is elucidated by a series of outline drawings which are decidedly useful.

In dealing with the jaws, Mr. Jessett follows the classification set forth in Heath's valuable monograph on "Injuries and Diseases of the Jaws." The tongue receives careful handling, and an excellent resumé of most of what has been said or written concerning the removal of that organ is given. A valuable analylical table of cases treated by various methods enriches this portion of the book.

It would be impossible to criticise the work in further detail. As a whole, it contains a vast mass of carefully-selected and sifted information, and will be welcomed by practitioners as a practical man's ready resort in cases of doubt or difficulty. It not only gives directions plainly, but offers many valuable suggestions alike for operation and treatment which cannot fail to be of the utmost value to those who have to treat cases of malignant disease. So excellent is the book, that it is a pity that some rather conspicuous verbal slips have been allowed to pass uncorrected, which evince evidence of the hasty work of a busy man.

Literary Notices and Selections.

THE PERILS OF PRACTICE.*

By Geo. L. Parmele, M.D., D.M.D., Hartford, Conn.

As an apt introduction and illustration of the ideas to which I wish to call attention, let me repeat something read the other day.

"When a small boy, I was carrying a not very large ladder, when there was a crash. An unlucky movement had brought the rear end of my ladder against a window. Instead of scolding me, my father made me stop, and said very quietly : 'Look here, my son ! there is one thing I wish you to remember, and it is that every ladder has two ends.' I never have forgotten it, though many years have gone by.

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* President's Address, delivered before the Connecticut Valley Dental Society at its Twenty-second Annual Meeting, held in Springfield, Mass., Nov. 5th and 6th, 1885.

Do we not carry many things that have two ends besides ladders ? Ah yes, every ladder has two ends, and it is a thing to be remembered in more ways than one."

Now gentlemen, even the ladder of dental practice has two ends, and one of them, that one to which many of you give too little heed, needs your careful attention. The end of the ladder where the rounds are composed of long worrying, tedious hours spent in close offices, making contortionists of yourselves in the earnest endeavour to ease and prevent the sufferings of others, and at the same time striving not to waste a moment in which you can earn reputation and an honest penny, you know all about ; of that I need say nothing. But it is of that end of the ladder which points to proper care of your own physical condition, both in the office and out in the pure air, that I wish you to think. That is the end to which, if neglected, a loud crash will sooner or later call your attention.

I do not wish to imply that you are not conscious of the other end of the ladder, neither is it my purpose to instruct as to the hygiene of professional life, with the laws of which you must be acquainted, but to remind the thoughtless that they cannot go on transgressing these laws without paying the penalty. No one will deny, I think, that maintenance of the body and mind in as nearly a normal condition as possible is worthy of more consideration than many of us give it.

The confinement in poorly ventilated rooms, breathing air poisoned by the exhalation of patients, many of them victims to disease, working for hours at a time in constrained positions, inflicting necessary pain on nervous patients, which, to a greater or less extent, causes nerve exhaustion in the operator, and the continuous concentration of vision upon minute objects, together with the constant worry and perplexity of business, are some of the reasons why those conscientiously engaged in dental practice will sooner or later break down, unless they take means to counteract these baneful influences.

One of the greatest evils of modern life is mental overwork, and there is no constitution so adamantine as to resist continuous confinement, weariness and worry. Work and play must alternate, for nature too severely tried is sure to call the balance and enforce a settlement. The adage "all work and no play makes Jack a dull boy" is one of those common sayings which we are bound to accept, whether we like it or not. Each violent emotion or train of thought operates upon the nutrition of the nerve centres, and continued worry and passion are more harmful than judicious hard labour.

With telegrams to keep them upon the *qui vive*, and express trains to hurry them hither and thither, Americans live at too high pressure. The influence of active competition is such that they think a holiday or outing cannot be afforded to relieve them of that intense, unremitting application, which leads to mental strain.

(*To be concluded.*)

Dental News.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

ORDINARY MONTHLY MEETING.

May 3rd, 1886.

T. Charters White, M.R.C.S., L.D.S. Eng., President, in the chair.

The Minutes of the previous meeting having been read and confirmed.

Mr. W. J. England signed the Obligation Book, and was formally admitted to membership by the President.

The President announced that the following gentlemen had been nominated as candidates for membership, and would be balloted for at a subsequent meeting, viz :

Messrs. Humphry Wingfield Tracy, L.D.S. Edin., 6, Hatter Street, Bury St. Edmunds;
Peter Crank, L.D.S. Eng., 7, Castle Street, Canterbury; and
Albert J. Kutz, L.D.S.I., D.D.S., 32, Wimpole Street, Cavendish Square.

The following candidates were then balloted for and elected members of the Society :—

Messrs. Albert Edward Clayton Woodhouse, M.R.C.S., and L.D.S, Eng., 1, Hanover Square, W.; and
Murray Davis, L.D.S. Eng., Wimpole Street, Cavendish Square, as Resident Members.
George G. Campion, L.D.S. Eng., 264, Oxford Road, Manchester; and
Horace J. Lloyd Farebrother, L.D.S. Eng., of Salisbury, as Non-resident members.

Mr. Willoughby Weiss showed the head of a lamb with hare-lip on the right side which had been sent as a donation to the museum by Mr. J. T. Fripp, of Willesden. The specimen had been admirably preserved and mounted by Mr. Sutton. The fissure did not extend to the palate.

The President said the thanks of the Society were due to Mr. Fripp for his interesting specimen, and to Mr. Sutton for mounting it. It afforded further proof of the fact to which their attention had been called by Mr. Sutton that man did not monopolize all the abnormalities.

Mr. Betts exhibited models of the upper and lower maxillæ of a boy aged five-and-a-half years, remarkable for the extreme smallness of the dental arches, and from the fact that the upper incisors had never erupted, whilst three of those in the lower jaw fell out when the child was two-and-a half, the remaining one being loose at the time of taking the impression. The boy, though delicate-looking, was not undersized, but the lower portion of his face was disproportionately small.

Mr. J. S. Turner showed an upper left lateral the labial portion of the root of which wrs absorbed to such an extent as to lay open the canal. He had extracted it from the mouth of a boy aged twelve-and-a-half, who came to him complain ing of pain in the upper teeth which could not be localised, and the cause of which appeared very obscure. The teeth were large, sound, and not crowded. Bearing in mind a case which had been brought before the Society a short time before by Mr. White, of Norwich, Mr. Tnrner extracted the lateral and found the state of things now seen. On passing a probe into the alveolus the lingual surface of the canine could be felt. It was the pressure of this tooth coming down in front of the other which had caused the absorption and exposure of the pulp, though previous to the extraction of the lateral there had been no indication whatever of its presence. He, Mr. Turner, thought that this case showed clearly the benefit which might be derived from attending the meetings of the Society, for had it not been for his recollection of Mr. White's case he should not have thought of extracting the lateral, and in all probability the case would have completely baffled him.

The President remarked that absorption of the roots of the second molar from the pressure of a misplaced wisdom tooth was not a very rare occurrence,—several such cases had been brought before the Society,—but the condition described by Mr. Turner was much less common; he himself had never met with such a case. It required a considerable amount of assurance to extract an apparently sound tooth, such as this was, and he congratulated Mr. Turner on his powers of diagnosis.

Mr. Newland Pedley showed a patient on whom he had operated for cyst in the upper jaw, together with a plaster cast of the tumour before operation, and read notes of the case.

The patient, a man aged forty-two, had been suffering for four years from a gradually increasing swelling of the left side of the face. He consulted a medical practitioner, who after a somewhat hasty examination, pronounced the growth to be malignant, and advised its total removal. Not feeling satisfied, the patient then applied to Mr. F. V. Mackenzie, of Kentish Town, and at his request Mr. Pedley was called in consultation. The swelling, which was as large as a hen's egg, extended as high as the margin of the orbit. There had never been any foul discharge from the nasal passages, nor any symptoms of inflammation of the antrum. Within the mouth a large sausage-shaped swelling could be felt in the buccal sulcus, very tense, but yielding a sense of fluctuation on firm pressure. As the result of his examination Mr. Pedley came to the conclusion that the disease consisted of a simple cyst, and proceeded at once to operate, making a free incision, an inch and a half in length, along the alveolar margin, and turning out the contents, which were of the usual semi-gelatinous character, and loaded with yellow shining masses of cholesterine.

The cavity was syringed daily with antiseptic and astringent lotion, and the opening kept patent. Only about three weeks had elapsed since the operation, but the deformity of the face had almost completely disappeared.

Mr. Pedley remarked that a point of interest in connection with the case was raised by the question whether so large a cavity in this region could exist independent of the antrum, and whether the antrum had been involved. He should be glad to hear the opinions of members who had taken the trouble to examine the patient.

The President remarked that patients suffering from swellings about the jaws and palate were always imagining that the disease must be cancer, though in the majority of cases they were not malignant, but could be traced to the irritation of some carious or dead tooth. Could any such cause be assigned in the present case ?

Mr. Pedley replied in the negative.

Mr. Charles Tomes related the following interesting case of replantation.

A boy had an upper lateral and canine knocked out at school. No attempt was made to replace the teeth at the time of the accident, but the boy mentioned it when writing to his mother, and she gave directions that he should come to London to have the tooth replanted, and he was accordingly brought to Mr. Tomes five days after the accident. Mr. Tomes felt very doubtful of success after so long an interval, but determined to make the experiment. He therefore removed the pulps of the two teeth, filled the pulp chambers and canals with gutta-percha, and then tried to replace them in their sockets ; but this was found to be impossible owing to the contraction which had taken place. He found, however, that the lateral fitted very well into the socket of the canine, and as there was a good deal of crowding, the loss of one tooth was not altogether an evil. The lateral was secured in place by means of a gutta-percha splint, and soon became firm. When last seen, six weeks after the removal of the splint, there was slight retraction of the gum about the neck of the tooth, but no sign of irritation, and the boy did not spare it. Of course time alone would show to what extent this experiment could be considered successful.

Mr. Tomes also gave an account of an experiment he had made on himself with cocaine.

Being troubled with a tender tooth, he thought it would be a good opportunity for trying the effect of a new remedy. He accordingly dissolved a grain of the hydrochlorate of cocaine in a small quantity of water and injected it at the reflexion of the mucous membrane of the cheek and lower jaw just below the tender tooth. The result was an area of anæsthesia about as large as a five-shilling piece, but it did not abolish sensibility in the tooth. Shortly afterwards, whilst engaged in writing, he became conscious of a most unpleasant feeling of giddiness and nausea, his hands became cold and clammy, and on getting up to pour out some brandy, he was slightly unsteady in walking. The symptoms soon abated, without his taking the stimulant, but a feeling of discomfort and nausea persisted for between two and three hours. He thought it well to call attention to the possibility of such effects being produced even by a dose of one grain, since he had seen the injection of a grain and a half and two grains recommended, and judging from his own experience it seemed to him that these doses might be attended with very unpleasant effects in some cases.

Mr. Newland Pedley said he was in the habit of injecting cocaine daily, and had met with no unpleasant after-effects as yet. The great majority of patients said they felt no pain from the subsequent extraction, but he freely admitted that some allowance must be made for mental effect. Thus in one case he painted the gum with carbolic lotion, assuring the patient that it would deaden the pain, then extracted two large teeth, and the patient declared that he did not feel it. At the same time he had no doubt that the cocaine had a good effect in most cases. Thus, in one instance he broke a molar in trying to extract it, and the patient suffered acutely ; he then injected cocaine and removed the roots, which were very firmly implanted, and the patient suffered no pain.

Mr. Boyd Wallis said he was in the habit of using cocaine pretty extensively, and in most cases with very satisfactory results. He had no doubt that it did obviate, or greatly lessen, the pain of extraction. Thus, finding it necessary to get rid of his own left lower canine, he had cocaine injected four minutes before the extraction and felt very little pain : he believed that if the operator had waited two minutes longer he would not have felt it at all. Another very satisfactory case was that of a dog, one of whose lower canines he was requested to extract. He injected cocaine, and removed the tooth, which was quite firm, without the animal giving utterance to a sound. He found it answered best for front teeth since in the case of back teeth it was more difficult to inject the solution.

Mr. J. S. Turner remarked that it was impossible to obtain trustworthy results from experiments of this kind if the patient was informed of the object of the application. The late Mr. W. G. Bennett made a number of experiments with electricity as a means of obtunding sensibility before extraction, and obtained very satisfactory results. At last he thought of disconnecting the wires from the battery, the patient being aware of the effect they were intended to produce, and the result was still successful. In fact, it was well known that with the majority of patients the most surprising results could be obtained by working upon their imagination. If reliable results were desired, the patient should not be informed of the object of the experiment.

Mr. S. J. Hutchinson said it might be well to remind those who had not yet tried cocaine in dental practice, and who might be desirous of doing so, that a freshly prepared solution should always be used, since it would not keep ; in fact, it soon became absolutely poisonous.

The President said he was sorry Mr. Hunt, of Yeovil, was not present to give his experience of the value of cocaine in cases of extraction. He understood that Mr. Hunt had used it largely, with very satisfactory results.

He could fully endorse what Mr. Hutchinson had said as to the importance of using only a freshly prepared solution of cocaine. He had been astonished at the rapidity with which dense masses of fungus developed in it.

Mr. J. A. Redman, of Brighton, exhibited and presented to the museum several specimens of abnormal teeth, including two good examples of three-fanged lower molars, a wisdom tooth with four fangs, another with roots bent at right angles, which of course was not extracted without difficulty, geminated roots of deciduous central and lateral incisors, and several specimens of calcification of the pulp. One of the last-named specimens belonged to a lady, several of whose teeth had been found to be similarly affected, and another to a patient who was suffering from ptosis, which soon disappeared after the extraction of the tooth.

Mr. Redman showed also a lower bicuspid, the root of which had been absorbed, and to which the following history attached. About a month before the tooth came out the patient accidentally bit upon a shot ; this caused severe pain in the tooth, which lasted for several days. The tooth then became loose, so much so at last as to be a source of considerable annoyance, and the patient removed it.

He then read notes of the following instructive case of necrosis of the lower jaw.

A man, aged thirty, came to him with a very tense, hard swelling on the left side of the face, extending well down the neck ; the angle and base of the lower jaw could not be felt. The patient complained of severe deep-seated pain, great difficulty in moving the jaw, and bad taste in the mouth from the constant presence of pus. He had been attended for some considerable time by a country doctor, who had ordered various kinds of outward applications but had never examined the mouth, though the swelling had been steadily increasing in size.

On examination Mr. Redman found that all the teeth were perfectly sound, with the exception of the first lower molar which was badly decayed and the pulp dead. An alveolar abscess had resulted, and its career being unchecked, the pus had infiltrated into the spongy part of the bone, which in this region is deep, causing necrosis of the whole of that side, from the ascending ramus to the symphysis. The teeth, from the wisdom tooth to the central incisor, were so loose that they could be removed with the fingers. A sinus opened near the wisdom tooth, another near the first molar, and a third opposite the lateral incisor, through all of which pus of a most effusive character exuded, and on passing down a probe the bone could be felt completely denuded of periosteum and partly detached. Fortunately, no opening existed through the cheek, although every effort had been made to promote one.

Mr. Redman removed the teeth, which were bathed in pus, and about a week later the necrosed portion of bone exfoliated in three pieces. The patient made a good recovery, scarcely any disfigurement resulting.

The case showed the serious mischief which might result from what was usually considered a very trifling ailment, viz., alveolar abscess, and the importance of calling in dental aid in all cases of swelling and pain in the region of the jaw. An examination of the mouth seemed often to be the very last thing thought of by the ordinary medical practitioner, instead of which the state of the teeth should be at once ascertained in any case at all resembling the above.

The President then called upon Mr. Storer Bennett to read his paper "On some recent additions to the Society's Museum." (See Page 540.)

EXAMINATION PAPERS OF ROYAL COLLEGE OF SURGEONS, ENGLAND.

The following papers were set for the diploma in Dental Surgery, June 15th, 1886.

ANATOMY AND PHYSIOLOGY.

1.—Describe the Tonsils, giving the structure of the Mucous Membrane, the character of the secretions, the Nerve and Blood supply, and the surgical relations.

2.—Indicate the structures and describe the mechanism by which the Head is turned upon the vertebral column, laterally and horizontally.

SURGERY AND PATHOLOGY.

3.—What Nerves are affected in the disease known as "Tic Douloureux"? Give the symptoms, diagnosis, and treatment.

4.—How is Fistula of the Parotid Duct produced? Give the treatment.

DENTAL ANATOMY AND PHYSIOLOGY.

1.—Mention instances of Teeth modified to serve as weapons for sexual combat. Describe the dentition of the Narwal.

2.—Describe exactly the positions occupied by the six anterior upper (*i*) Temporary, (*ii*) Permanent Teeth in their crypts. How are they ultimately enabled to stand in a regular arch.

3.—If a tooth be disintegrated by mineral acids, what structures will the residue contain? Explain the origin of these resistant tissues.

DENTAL SURGERY AND PATHOLOGY.

1.—What morbid conditions affect the roots of Teeth? How far are they remediable, and by what means?

2.—What appearances have led to the supposition that Caries of the Denture is an inflammatory affection? What are the arguments to the contrary?

3.—Mention the various modes of Securing Artificial Dentures discussing their advantages and disadvantages. What circumstances favour or impede atmospheric adhesion.

STUDENTS' SOCIETY OF THE NATIONAL DENTAL HOSPITAL.

ORDINARY MEETING, JUNE 4th, 1886.

WILLOUGHBY WEISS, ESQ., L.D.S., President, in the Chair.

The minutes of the previous meeting were read and confirmed. Mr. E. G. Carter brought forward a model of upper jaw of patient, about 10 years old, showing two large supernumerary teeth, displacing the permanent centrals ; he also presented to the museum two upper molars with four roots each, and a bifurcated lower lateral of the permanent set.

Mr. Jones presented models showing hypertrophy of the gums in upper and lower jaws. The patient has since been operated on at St. Bartholomew's Hospital.

Mr. Fripp showed two supernumerary teeth from a patient about 40 years old. They were situated in the molar region, and were both much decayed when removed.

Mr. Rymer was unanimously elected curator and librarian to the society.

The President then called upon Mr. Fripp for his paper on the "Preparation of the Mouth for Artificial Dentures and Insertion of the same."

A discussion followed, in which the President, Messrs. Gaddes, Rymer, Read, &c., took part.

At the close of the discussion Mr. Fripp replied.

A hearty vote of thanks was then accorded to those gentlemen who had brought forward casual communications, and to Mr. Fripp for his paper, and the meeting was adjourned until Friday, October 8th, when Mr. Patterson has promised a paper.

Correspondence.

To the Editor of the British Journal of Dental Science.

Sir,—I am pleased to find that my letter to your Journal on Liquid versus Home-made or Uncompressed Nitrous Oxide Gas has produced a reply from Mr. Alexander Jamieson, F.C.S. ; but I fail to see in his letter any attempt to call in question my statements respecting the superiority of home-made gas for dental purposes. His letter is a simple assertion that nitrous oxide, during compression, is purified and that notably the poisonous gas nitric oxide (NO) is eliminated. With regard to my statements, I am pleased to be able to fall back upon the recorded opinions as stated in the British Journal of Dental Science of December 15th, 1884, of Mr. J. Wm. Roberts, L.D.S., F.R.S., Glasgow, which coincides identically with my own experience. In reading a paper on anæsthetics and their administration, and after describing the process of manufacture in the ordinary way he says as follows :—

" A few years ago it was discovered that nitrous oxide gas, by applying at a low temperature a pressure of 30 atmospheres could be condensed into a liquid state. This has been extensively manufactured and supplied to the profession, but hitherto the process appears to have been kept a secret.

During a correspondence I had with a manufacturer, in speaking of the purity of his gas he said that 'if nitrous oxide gas was passed into the holder containing water and allowed to remain 24 hours, it would take 200lbs. more on the square inch to liquefy it, whereas I find from personal experience the gas is much safer and pleasanter to inhale after being in contact with water for a few hours.'

This, to my mind clearly proves that the purity of the gas so manufactured is very questionable, as instead of being passed through the several purifying solutions in a practical manner, it appears to be purified upon the theory that notwithstanding any impure gases which may pass over from the flask, by subjecting it to pressure of 30 atmospheres, only nitrous oxide gas becomes condensed and liquefied. Now Sir, on the face of this how can manufacturers advertise second quality nitrous oxide gas. Either it must be pure nitrous oxide gas, or it must be impregnated with nitrous acid gas, or nitric oxide, yet it is said that nitrous acid gas cannot be condensed with a less pressure than 300 atmospheres and nitric oxide 270 atmospheres.

For some years I have used both the liquid gas and the diffused gas from the gasholder, I mean the gas chemically purified, and have noticed a marked difference, in fact such a difference that where medical men have taken the diffused gas themselves, or their patients, they decidedly objected to the liquid gas afterwards. To one who is in the habit of administering both forms, the difference is much better recognised. The compressed gas has a sweet taste, and frequently produces a sense of suffocation, and if pushed to a complete state of anæsthesia the patient frequently assumes such a livid hue and stertorous breathing, as to be positively alarming, and in young people of a hysterical character the after effects suggest the question 'Is the remedy not worse than the disease?' Now with the diffused gas if perfectly pure there is not any recognisable taste, little or no lividity, stertorous breathing very rare, and anæsthesia may be pushed much further without the alarming symptoms. This Sir, I think clearly proves the theoretical purity of nitrous oxide to be very faulty and although both liquid and condensed answer the chemical test, that this test is also very unreliable. It is I believe a fact that the principal if not the only deaths which have occurred during the administration of nitrous oxide gas have been where the liquid gas has been used.

Now, Sir, as this is a question of some importance I think the manufacturers of compressed gas would do well, in informing the profession how the impurities given off in manufacture are eliminated. Doubtless those members of the profession to whom chemistry in its elementary forms is an unknown Science, and whose practical experience does not extend even to the bending of a glass tube, or the perforating of a cork, the manufacture of gas would prove a tedious process; I still adhere to my statements that when once the apparatus is put together and the purifying solutions in good order, the making of gas is a very simple thing and requires no mental effort, in fact the 'sharp boy' after being once put it the way of it can superintend the operation. Besides by using one of Ash's regulators the heat under the flask can be always maintained at a proper temperature, and if impurities are given off they cannot fail to be arrested in the wash bottles.

I find that the gas is very much improved after standing over water for a day or two. Apologising for this lengthy epistle.—I remain, yours truly,

T. H. COLEMAN, F.C.S., &c.

Ta the Editor of the British Journal of Dental Science.

Sir,—Concerning the letter of Mr. Coleman in your issue of May 15, I cannot understand why uncompressed Gas after washing should possess better anæsthetic properties than the compressed gas after a similar treatment; for, if the process of washing has been conducted with care, no amount of compression can alter the molecule of N_2O. It is highly probable that this gas when it does decompose becomes pure oxygen and nitrogen, and does not form intermediate or other oxides of nitrogen.

If I desire to prepare nitric oxide (NO), or nitric peroxide (NO_2), I could do so by heating to a high temperature a nitrate, preferably one from the heavy group; but in the case of nitrate of ammonium the point of decomposition occurs at a temperature which can be easily be ascertained and maintained.

Sir Humphrey Davy it is well known, shewed by experiment whe preparing this gas for anæsthetic purposes, that by the use of *dry (fused) pure* nitrate of ammonium and regulating the temperature under these conditions even the "sharp boy" alluded to and emphasised by Mr. Jamieson, could not go wrong. I think it is quite evident that compression *per se*, cannot in any way affect its physiological properties, and if this be so, surely there can be no question but that this gas in its compressed form is most convenient to the majority of practitioners.

WILLIAM ELLIOTT, L.D.S. Edin., F.C.S.

Birmingham, June 11th, 1886.

A Really Useful Book.—James Platt, the well known writer of a number of excellent little volumes on some of the popular questions of political economy, has brought out a fresh book, entitled "Land." It comprises a good deal of information about the land question, registration of title, freeholds, leaseholds, copyholds, rent, landlord and tenant, Irish land acts, &c., and should be read by all who take an interest in large or small landholdings.

APPOINTMENTS.

Mr. John T. Hughes has been appointed Dental Surgeon to the Hospital for Consumption and Diseases of the Throat, Bowden, Cheshire.

Mr. J. Jones Bailey, L.D.S., Edin., has been appointed Honorary Dental Surgeon to the Royal SurreyCounty Hospital, Guilford.

NEW EXAMINER AT THE COLLEGE OF SURGEONS.

It will be heard with pleasure by the profession that Mr. J. Smith Turner is the Examiner recently appointed.

DENTAL HOSPITAL REPORTS. NATIONAL DENTAL HOSPITAL,

Monthly Statement of Operations performed, From May 1st, to May 31st, 1886.

Number of patients attended		1713
Extractions	Children under 14	435
	Adults	611
	Under Nitrous Oxide	430
Gold Stoppings		82
Other Stoppings		559
Advice and Scaling		283
Irregularities of the Teeth		235
Miscellaneous		147
	Total	2782

Isidore Fred. Prager, House Surgeon.

WORK DONE AT THE VICTORIA DENTAL HOSPITAL, MANCHESTER,

During the Month of May, 1886.

Number of Patients attended		966
Extractions	Adults	738
	Under 14	
	Anæsthetics	50
Stoppings.—	Gold	19
	Other Stoppings	111
	Miscellaneous	350
	Total	1268

HENRY L. KNOOP, Hon. Secretary.

British Journal of Dental Science.

No. 444. LONDON, JULY 15, 1886. VOL. XXIX

CLINICAL LECTURE ON TUMOURS OF THE TONGUE.

By Mn. Tillaux of the Hotel Dieu, Paris.

I am about to operate on a patient of the Salle Saint Come, who has a tumour of the tongue the diagnosis of which is somewhat obscure. I intend to discuss it before you.

This man is a strong healthy carman. He denies ever having had syphilis and I am unable to detect any sign of this disease, a point of some importance as you will see by and by. He is a non-smoker, the only thing I am able to discover is a very bad condition of the teeth. There is some gingivitis and on a level with the tumour the internal border of the lower molar is sharp and rather rough. The patient tells us he is somewhat in the habit of biting his tongue.

There is some doubt about the way in which the tumour first appeared. Our patient only discovered it three weeks after he had bitten his tongue just about this region. The tumour has remained in much the same condition ever since. It seems very probable that if it has remained stationary for three weeks, it must have formed very slowly and it must have existed long before the patient's attention was drawn to it by the bite.

The tumour is seated on the left border of the tongue on a level with the second molar. It forms a slight projection on the upper surface and sinks rather deeply into the substance of the tongue. Its shape is perfectly globular. It has the volume of a large pea, it feels firm and resistant. I am unable to detect any roughness on its surface. The mucous membrane—this appears to me to be a sign of the greatest importance, moves easily over the surface of the tumour which is itself very moveable and quite unattached to any of the deep parts. Finally this tumour is quite painless, it does not even give rise to any inconvenience ; pinching causes no pain. The patient himself only became aware of its presense after biting himself.

The glandular system is quite unaffected. A week ago, it in true, I detected a gland in the left submaxillary region, but it was ill defined, did not roll under the finger, and it was evidently surrounded by a slightly inflamed sheet of cellular tissue. It was an inflamed gland which subsided spontaneously within two days.

What is the nature of this tumour ? Let us begin by setting aside all forms of ulcerated tumours.

Clinically, tumours of the tongue may be divided into two groups the common and the rare tumours. In the first class we may include aneurysms, lipomas, cysts, fibromas, and chronic abscesses. This tumour does not appear to me to fluctuate, I suppose I must therefore look upon it as a solid mass ; if instead of being in the tongue it were under the skin I should think at once of a fibroma.

The tumours more commonly met with are syphilomas or gummas (we may exclude sclerous glossitis which is met with in the form of different patches scattered about the substance of the tongue), and epitheliomas. The latter sometimes take the form of papillary tumours, at others they occur as interstitial tumours. A papilloma, however, very soon ulcerates, so that I think we may exclude it, whereas an interstitial epithelioma which in some cases is quite isolated at first, and unattached to the soft parts, has many points of resemblance with this tumour and deserves to be thoroughly discussed by us.

Has this patient a syphiloma, an interstitial epithelioma, or fibroma ? This is the question we have to settle. We may put aside the syphiloma ; for he has no syphilitic history and he bears no traces of any form of syphilitic lesion. Besides which a syphiloma always occurs as a tumour, but slightly moveable over the adjoining parts with which it fuses more or less, however, it seldom occurs as a solitary tumour. We usually meet with a certain number scattered about in the substance of the tongue.

Having cast aside the idea of its being a syphilitic tumour, we have brought the diagnosis to lie between an epithelioma and a fibroma. I need not remind you of the importance of the diagnosis in this case, especially with regard to the prognosis, for if the case be one of epithelioma the man will be dead within two years at the outside, whereas a fibroma would be a tumour of slight moment.

An epithelioma, however, from the very instant it appears becomes united to the neighbouring parts; it contracts adhesions to the muscles of the tongue which it infiltrates at the same time that it rapidly invades the mucous membrane. In this case, however, the tumour does not adhere to the mucous membrane and even appears to be unconnected with the deeper tissues and is quite movable.

Besides this, also, an epithelioma is not so uniformly consistent and has not such a regular outline as the one of this tumour; a malignant tumour usually gives rise to pain, spontaneous pains in the ear and pharyua, and pains produced by exploration, examination, or by the passage of food. An epithelioma also is soon accompanied by some swelling of the glands.

One point alone makes me feel very doubtful, and that is the rapidity with which it has grown according to what the patient states. But it is more than likely that it has been much longer growing than what he says, he certainly must have already had the tumour for a very long time when the biting of his tongue made him notice it quite accidentally. It is impossible for us to admit that a tumour can suddenly acquire the size of an almond and then remain perfectly stationary for three weeks.

To sum up, my diagnosis is somewhat doubtful and lies between an interstitial epithelioma in its earliest stage, and one of the unusual tumours of which we have spoken, but I must acknowledge that I rather lean towards the latter hypothesis. When I operate on this patient, I shall be careful not only to remove the tumour itself, but also some of the surrounding tissues, in order to reduce the chances of a recurrence to a minimum, in the event of our having to deal contrary to what I suppose with an encysted epithelioma, and this the microscope will finally set at rest.

The microscopic examination by Mn. Cornil showed the tumour removed by Mn. Tillaux to be a primitive cyst of the tongue with thick walls which contained a small quantity of mucus.

Eight days after the operation the patient left the hospital perfectly cured.

STUDIES OF THE PATHOLOGY OF HUMAN TEETH, WITH SPECIAL REFERENCE TO THE ETIOLOGY OF CARIES.

By Frank Abbott, D.D.S., New York.

(Concluded from page 590.)

Enamel of this description may be seen only on one portion of the tooth, while the rest is normal. With this curly appearance of the enamel-rods, in all my specimens, pigmentation is combined as a marked feature, and the interstices between the rods are a trifle wider than normal. Both of the latter features must involve a deficient calcification, and consequently extreme brittleness. It is very difficult to obtain perfect specimens of such enamel. The dentine subjacent to such anomalous formations is freely supplied with interglobular spaces (which is likewise a sign of deficient calcification).

IV.—Deficient Calcification of the Enamel without Pigmentation.

The friability alluded to under the previous heading is in some instances very marked—so much so, in fact, that it is impossible to obtain an unbroken slab of a tooth even with the finest grinding stones. With low powers of the microscope we observe that the broken ends of the enamel-rods look as if corroded, or as if some of them had been displaced, or torn off by the process of grinding. Neither pigmentation nor an anomalous course of the enamel-rods is necessarily connected with such a condition of the tooth. The most striking feature, however, visible even with low powers, is that the enamel-rods are unusually narrow, the interstices between them unusually wide, and their tenants, the enamel fibres very prominent. The cross-lines of the enamel-rods are likewise considerably widened and irregular, so that the fields of basis-substance look unusually small and irregular. The reticulum in the immediate vicinity of the interzonal layer is also unusually prominent.

Such a condition of the enamel may occur both in temporary and permanent teeth, and may be combined with pigmentation. It is a feature of such deficient enamel that it readily stains with an ammoniacal solution of carmine, something that normal enamel will never do. The subjacent dentine, under such conditions, may either be perfectly developed, as before stated, or be deficient in its formation, as shown by the presence of more or less numerous interglobular spaces.

All clinicians have observed congenital white or yellow spots in the enamel of the teeth, which if broken into are found to be of the substance of chalk. Such spots have been termed " white decay," although they do not correspond to the process of caries as we usually understand it. They mean nothing but deficient calcification. Again, all clinicians have seen teeth across which a row of pit-holes exists, where in many instances in the bottom of the depressions no enamel is to be found. This condition is also always congenital, and closely related in its origin to pigmentation and the white or yellow spots. In other instances an originally smooth enamel is mutilated mechanically by the process of mastication, with the result of loss of substance, with abruptly broken, jagged edges. Again, we see teeth with a great portion of their crowns covered by a brownish-yellow substance in place of enamel, which is so soft as to be easily removed, leaving the dentine bare of its covering and extremely sensitive to the touch of an instrument, the pressure of food in mastication, etc. These conditions, again, are, in most instances at least, connected with pigmentation and the white or yellow spots. We might call them exaggerated cases of the same condition. Obviously these congenital defects are dependent upon deficient deposition of lime-salts in the basis-substance, rendering the enamel less resistant and more friable.

V.—Pigmentation of Enamel.

One of the most common pathological conditions of the enamel is its pigmentation. Sometimes it is so slightly marked that the naked eye discovers only a slightly yellow-brown discolouration ; in other instances it is quite prominent and readily discernible. Specimens of such teeth under the microscope will correspondingly exhibit either a dim yellow tint in the enamel or a very marked brown discoloration. The pigmentation may occur either in non-stratified or in stratified enamel. In the first instance there is no demarkation of the brown spot toward the colourless enamel ; only faintly-marked offshoots of the main spot, tapering toward the dentine, and running in an oblique direction, will indicate the fact that pigmentation has occurred during its formation. In the second instance, on the contrary, if pigmentation invades stratified enamel, there is a close relationship between the two, inasmuch as the deepest stain invariably corresponds to the boundary line of the strata, tapering toward the neck, and gradually fading toward the proximal end of each stratum. Thus, in longitudinal sections, a beautiful fan-like configuration is produced.

The pigmentation may invade all layers of the enamel, often being more marked in the deeper than in the superficial portions. Higher powers of the microscope reveal the following facts : First, that the brown discoloration concerns the basis-substance of the enamel-rods only. Secondly, that the interstices between the pigmented enamel-rods are widened,—not due to the contrast in colour, but to a deficiency in the formation of the basis-substance. Thirdly, that the transverse lines of the enamel-prisms are likewise (at least in many instances) enlarged. Fourthly, that the enamel-fibres and their lateral offshoots are more conspicuous than in normal enamel, and more so even than in the enamel of temporary teeth, and in many places distinctly beaded. Pigmented portions of the enamel are very prone to take up a red stain on being treated with an ammoniacal carmine solution.

As to the origin of the brown discolouration, I have to say, as a suggestion simply, that at the time of the formation of this tissue there must have been a disturbance in the enamel organ which interfered with the proper construction of the basis-substance and the deposition of lime-salts. What this disturbance really was, I am unable to say. All pigments of the body depend upon and are closely related to the coloring-matter of the blood. I am loath, however, at this time, to attribute pigmentation of enamel to the extravasation of blood-corpuscles or diffusion of the colouring-matter of the blood. Careful studies in the history of the development of this tissue must be made before an attempt at a solution of this question will be admissable. One point I am positive about, however, is that this pigmentation is congenital, invading temporary as well as permanent teeth. Acquired pigmentation of enamel seems to be of comparatively rare occurrence, except as a result of caries. I have seen pigmentations of its surface, of a deep orange colour, not penetrating the enamel-tissue in the least. Caries on the surface often causes an orange discolouration, diffused and fading toward the normal portions. Several of my specimens plainly show an invasion of the enamel by caries, on spots pigmented congenitally ; secondarily, an orange diffused discolouration has taken place, which is likewise prone to take up the carmine stain ; thus beautiful shadings of brown, orange, and red are to be seen, the brown being congenital, the orange acquired, and the red artificial. What chemical may lead to an acquired pigmentation or discolouration of of the enamel I cannot say.

VI.—Granulation of Enamel.

Under this heading I propose to describe a very peculiar pathological condition of this tissue, which, so far as my specimens indicate, is by no means rare. It consists of pear spindle, and club-shaped spaces in the middle of the substance of the enamel. Such spaces were known to exist heretofore at the junction of the dentine and enamel only. They may appear at the distal boundary of one of the cusp-layers, or there may be several rows of such spaces, varying in extent and degree, but it sometimes occurs that only the outermost cusp or neck layers are freely supplied with them, whereas the rest of the enamel is normal or more or less pigmented.

Higher powers of the microscope demonstrate that the spaces are enlargements of the interstices between the prisms and the tenants of the interstices. The enamel-fibres are in direct connection with the contents of the spaces,—i.e., with living matter. The spaces, at their stem-like beginnings, run accordingly parallel with the interstices; but in their broader portions may cross enamel-prisms in different directions. If they are few in number they may protrude from the boundary line of a cusp-layer, and penetrate the adjacent cusp-layer obliquely to the main direction of the enamel-fibres even with the club-shaped ends projecting into the neighbouring cusp-layer. If these spaces are present in large numbers, the enamel, with lower powers of the microscope, will look dark and granular ; hence the name " granulation of enamel" which I have given it.

In stratified and granular enamel, single strata may be produced by an interruption of the pigmented enamel-rods, by convex ends directed toward the adjacent peripheral cusp-layer.

The *interprismatic* spaces of the enamel bear some resemblance to the interglobular spaces of the dentine. I have seen both conditions in a highly-marked degree present in one of my specimens. Whenever these *interprismatic* spaces are present along the border of a cusp-layer they considerably lessen the degree of consistence of the enamel, which upon being ground easily breaks off along the dark granular line.

The nature of the *interprismatic* spaces is plain enough. They mean an incomplete formation of the enamel, owing to some deficiency of function in the enamel-organ during its formation. Obviously not only the basis-substance is deficient, but also the amount of lime-salts, is considerably less than normal; hence its brittleness and proneness to decay.

Under the foregoing headings I have described a number of pathological conditions of the enamel, which, at least so far as stratification, pigmentation, and granulation are concerned, mean a deficient formation of the basis-substance, together with decreased deposition of lime-salts. These conditions are, in my judgment, of the utmost importance in the etiology of caries. Ailments either of the mother during gestation or of the infant in the earlier periods of life obviously cause such anomalies in this tissue. These ailments are known to occur far more frequently in refined people, debilitated, as it were, by civilization, than in strong, hard-working, plain-living people, continually engaged in a struggle for life. Thus, I have directly demonstrated and anatomically shown, in a measure, at least, the reason why refined people are, far more subject to caries of the teeth than people lacking such refinement.

As to the literature upon the subject of pathology of the enamel, I have nothing to say, since, to my knowledge at least, none exists.

NOTES ON DENTAL HYGIENE.

Chiefly Addressed to Young Practitioners.

By George Robinson, Oarnam, New Zealand.

That dental hygiene in the surgery and laboratory and their various contingencies, are still imperfectly attended to, I have for many years been convinced, and will feel obliged if you will allow me a little space in your valuable journal to air some of my views upon this subject, when convenient to you, and subject to your scrutiny.

It is very surprising, to me a matter of query, how those dentists manage to afford any time for cleanliness who charge such ridiculously small fees for extracting teeth, and other operations, their general surroundings must surely be very imperfectly attended to, and must sooner or later become, to put it mildly, rather unwholesome, and conducive to the diseases of both their own teeth and impairment of their health in various ways, perhaps undreamed of by the majority. The most scrupulous cleanliness in connection with our work, instruments, and general surroundings, is of the utmost importance to both dentists and their clients.

Instruments should be thoroughly cleansed by the intelligent use of suitable antiseptics, as 10 per cent. of carbolic acid, and tincture of iodine, when that is indicated, and liquor potassii permanganatis ; such precautions are specially needed when the instruments have been used for persons in bad health, or when certain diathes are even slightly suspected. To some persons precautions may appear unneccessary, but to those who are by microscopical research acquainted with bacteria, it must be otherwise. A case of ozœna may pass unobserved by many, while to others it is so unmistakably proclaimed, that it is quite oppressive. After operating in such cases, great relief is afforded to the offended olfactory sense by the liberal use of a little Condy's fluid in water in which the operator performs his evening ablutions after work. This every wise operator will not fail to do most thoroughly. For some antiseptic purposes menthol is, I believe, superior to all other agents.

The use of disinfectants or antiseptics should not be relied upon in any case as a substitute for thorough cleanliness. They are poor, indeed, unless supplemented by ample supplies of fresh air in the laboratory and surgery, and general hygiene. The flame of a spirit lamp, cautiously applied to an instrument which has been wiped after using, may prevent possible contagion.

A denture which has been worn, and is presented for repair, addition, or other purpose, very often needs a decided antiseptic treatment before being manipulated in the least. Fresh, dry garden earth is very good. Solution of chloralum is useful to immerse plates in ; but sometimes more potent means are desirable. As an instance I may mention a recent case which was presented to my notice, the most objectionable one I have seen for many years, since ivory went out of use, was a set of teeth on celluloid, made eighteen months ago, by a respectable practitioner, and with most recent improvements in the pivot ; the plate of the lower set, particularly, was completely perforated along the buccal and lingual surfaces, as if perforated by a "Teredo Dentalis," being porous on close inspection, with the unaided sight. What would a microscopic exploration reveal ? Myriads of bacteria, living, dying, &c., &c. ; this is one of several cases which I have seen which seem to confirm all the statements of people who are practically acquainted with the unreliable character of celluloid. Messrs. Ash & Son, of London, than whom no more trustworthy authority exists, on dental materials, have informed me, some twelve months ago, that it has been abandoned both in Great Britain, the Continent of Europe, the United States, India, &c. No doubt the (very erroneous) supposed advantages which cheap dentistry affords a deluded public, have brought this and other perishable bases into use ; its beauty is but skin deep, and it fades accordingly, and becomes wrinkled early, and probably also do those who wear it, and directly or indirectly suffer more or less impaired health, both from the unsanitary condition of the mouth and also from the disappointment and worry consequent upon imperfect mastication. No amount of scrubbing could remove the unhealthy secretions with which such cases become loaded. A large number of persons are unable to detect such conditions, at least for a long time, owing to their defective sight, until aided by powerful magnifiers, which reveal the hidden mysteries of the oral inhabitants, and compel the most sceptical to admit the truth of Hamlet's well-known exclamation. There can be no doubt that the greater care is necessary to ensure perfect sanitation in everything connected with the art and science of dentistry, and to satisfy the demands of an exacting public, as well as for the comfort of the practitioner's own conscience, and thus by avoiding these causes of disease and worry, the dentist's own life would be greatly prolonged.

Young dentists of a few years' practice evidently do not always see the necessity of such precautions until they have felt the effects of unsanitary conditions ; but neglect will with the busy pursuit of our calling, tell its own tale, whether it is perceived or not.

On reference to the Odontological Society's Journal of Transactions, I observe Mr. Oakley Coles, has dwelt exhaustively on the subject of maintenance of health in dental practitioners, and many of those excellent remarks I can confirm from personal experience and observation, and I may add I have found great benefit from the use of a Lyon's stool, which for some twelve years or so I have had in use, otherwise I would have been unable to continue my work before I came to this colony, where 1 have had a great deal more leisure than work, and being much stronger, have little need to use it.

(*To be continued.*)

STRICTURE OF THE ŒSOPHAGUS.

By Chas. F. Forshaw, D.D.S.
Formerly Dispenser to Bradford Eye and Ear Hospital, and late Dental Surgeon to Childrens' Hospital.

During a conversation with one of my patients several months ago, he accidentally mentioned that his niece (Miss S., aged 23) was suffering from some affection of the throat, which caused great difficulty and pain both in breathing and swallowing her food, especially solids, and asked me if I could do anything for her. I therefore made an appointment with him to see his niece, and from her learnt the following history of the case :—Miss S., about seven years ago, took a drink from a wine bottle which she thought to contain raspberry vinegar, but which was, unfortunately, a very strong solution of caustic potash, used for taking paint off wood. The result was that it caused the skin to peel from the mouth and throat, and to become raw and exceedingly painful. The mouth soon got all right, and by the advice of Dr. W. she took large quantities of milk and farinaceous food ; she seemed to make but slow recovery, so a few weeks after the accident she consulted the late Dr. O'Gilvy, of Leeds, who, in the patient's words, put a stick down her throat, and thus opened it out. After several consultations with Dr. O. she seemed to get considerably better, could swallow bread, meat, cheese, and other food that required chewing, but it occasionally, perhaps once a fortnight, contracted, and prevented her swallowing even fluids, without great difficulty, and no little pain, and thus made it requisite for her to keep visiting Dr. O. A few years ago Dr. O. died, and consequently she had to consult another surgeon. Dr. W. could not succeed in passing a bougie, so they tried Dr. B., who though he could pass one, it was not of sufficient thickness to do any lasting benefit. At the time of my seeing her she was much emaciated, and very pale and anæmic looking. I advised her to see Dr. A. Rabagliati, senior honorary surgeon to the Bradford Infirmary, a gentleman with whom I am daily associated ; they accepted my advice, and one evening I went with them to see the doctor, who succeeded in passing a much larger œsophageal bougie than she had ever had passed before. In all she saw Dr. R. ten times, and at my request he was kind enough to let me see him operate. He ordered from Maw, of London, some special bougies, extra thick, and though he experienced a slight difficulty at first owing to the patient retching and vomiting, he soon succeeded in passing them, with but little discomfort to her. About the seventh time they saw him, she seemed much worse, had not eaten anything at all for three days, so the doctor tried to feed her by means of a glass funnel with milk in, which, held above the patient's head, ran through a tube into the stomach. This caused her to cough and choke, so he withdrew the tube, and as she was very weak, owing to having no means of deglutition he recommended nutrient enemata. The next day she seemed much worse, in fact, her parents thought there was now no hope for her ; her aunt came to my house at night and asked me if I could send for the doctor. I immediately sent my pupil for him ; and on his (the doctor's) arriving at the patient's residence, he succeeded in passing the bougie, which I ought to have mentioned previously, he was unable to do the last time, as every time he attempted the patient seemed in imminent danger of choking, although of course it was but momentary, and if she had borne it for the time, the effect would have passed off. This was in January last, and from this time she made rapid recovery, in fact she is just as well now and can eat as freely as if the accident had not occurred, a state of things which she had not experienced for the seven years previously. I should have said that the caustic caused the upper central incisors to decay very rapidly away, so that within a few months of the accident she was compelled to have a partial upper denture made to repair the loss of her own, these of course had to be taken out previously to passing the bougie.

Extracting Teeth with the Pistol.—Old Dr. Mousey extracted teeth by fastening a strong piece of cat-gut securely to the tooth, to the opposite end of which he affixed a bullet. With this bullet and a full measure of powder, a pistol was charged, and when the trigger was pulled, the operation was performed effectually and speedily. Once a gentleman who had agreed to try the novelty, and had even allowed the apparatus to be adjusted, at the last moment exclaimed, "Stop, stop, I've changed my mind!" "But I haven't, and you're a fool and a coward for your pains," answered the Doctor, pulling the trigger. In another instant the tooth was extracted, much to the timid patient's delight and astonishment. We find the above somewhat striking item in *Items of Interest.*

British Journal of Dental Science.

LONDON, JULY 15, 1886.

THE ESTABLISHMENT OF PROVINCIAL DENTAL HOSPITALS.

The multiplication of dental hospitals in the larger provincial towns naturally calls one's attention to the question, whether the movement is likely to promote a good or a bad end. One is bound to admit that much has to be said on both sides of the question. And this is borne out by the difficulties which have arisen, or perhaps have been made, at the establishment of more than one provincial hospital, and is shown further by the rancour and personality indulged in when the first discussion was raised as to starting the concern. In the first place it is often hard to decide if a town can support an institution of the sort we are discussing. The "spurt" required to initiate almost any enterprise is generally determined by personal friendships, and possibly by a hope to a *per contra* account to follow in due course, but the prolonged support, yearly subscriptions, and annual donations for an institution which avoids undue publicity, while it soberly and unobtrusively pursues its course of well-doing, is wholly another matter. The outside public can hardly be relied upon for support unless it can be shown very plainly that an institution is one which actually ministers to their own immediate wants, and it is usually difficult or impossible for a newly established hospital to collect anything like a large *clientele* for some years. During this time of waiting expenses run on and so there must be a reserve of energy, and a reserve of monetary funds upon which to fall back should troublous times be met with at the first. However, in these days of common sense when laymen are always ready to assist professional men with their advice and business experience, a few well-known and respected business men belonging to the town, can usually be pressed into service as committee men or governors, and they will aid the charity by arranging the outgoings that they may correspond with the income. Another difficulty met with in the promotion of a dispensary or hospital is the question of the staff. It often happens that the senior dentist in a town, having achieved a large and onerous practice, is averse to undertaking the work of an hospital surgeon. Few know how laborious such duties are, how much anxiety and self-abnegation are involved in the due performance of them. But when the seniors hold aloof the public are only too apt to imagine that the younger men are promoting a sham charity in order to achieve a position for themselves, and actuated by motives the reverse of disinterested. It is a very great pity that this feeling exists, but, as long as it is present in the minds of the public, it is most important that all institutions should affiliate, even if only as members of the honorary staff, practitioners whose names guarantee the *bona fides* and efficiency of the work proposed to be done. The position also of a dental hospital in a provincial town is somewhat peculiar. The time-honoured fiction is still dominant in many minds, that dental diseases are efficiently treated, and dental operations carefully performed at the general hospitals, and that, therefore, the establishment of a special hospital for dental surgeons is a work of superoragation, and so a robbery of the funds of the needy hospitals already in existence. Never was a greater fallacy brought forward. Not one house-surgeon in five hundred ever has the chance of seeing any dental work, much less of doing any himself. He has frequently extracted an aching tooth whilst a student, and broken many in attempting their removal, but that is all. Dental hospitals are not, as some persons appear to imagine, mere extracting rooms, the work carried on is the preservation of the teeth, and not their destruction. But all questions have two sides. We have considered some of the most forcible arguments adduced against founding dental hospitals, let us briefly pass in review a few of the facts which justify their establishment. In the larger towns where large factories exist, and steam machinery causes endless accidents, the general hospitals have plenty to do, but in towns such as Brighton, Winchester, Lincoln, and others the number of dental accidents and injuries far exceeds ordinary surgical casualities, nor can their importance be estimated lightly when we consider that tetanus trismus, angina Ludovici, necrosis of the jaw, or extensive abscesses are all complications liable to follow neglected dental lesions. In short only skilled dentists are at all able to judge how vast an amount of suffering is saved by early and careful attention to incipient dental troubles. Nor is it possible for the poor and necessitous to obtain the aid and assistance they require save in an hospital. A long discussion was carried out through the medium of a contemporary upon the question whether the general hospitals of London were capable of dealing with dental surgery. Even in London it is found almost impossible, in the provinces it is certainly impossible. A special dispensary or hospital enables a staff to grapple with and systematically to carry on their work as dentists for the benefit of the necessitous poor, and hence it is that we cannot but be glad to find the larger towns providing themselves with special hospitals.

Dr. Herbst is making a stay in America.

Honors to the Dental Profession.—Dr. Evans the well-known dentist of Paris has received the decoration of the "Order of the Polar Star" at the hands of the King of Sweden. This is in gratitude for successful treatment by Dr. Evans.

Conversazione of the Students Society of the Dental Hospital of London.—On Tuesday, July 20th, the prizes gained by the students of the Dental Hospital of London will be distributed. Mr. J. Smith Turner will take the chair and the evening will be closed with a conversazione at the Marlborough Rooms, when several well-known musicians and vocalists will, we understand, be present.

COLLODION OVER EXPOSED LIVING PULPS.—A small quantity of collodion between the oxyphosphate and the pulp is said to be unirritating and to act remarkably well.

The *Independant Practitioner*, says, "The advent of cocaine as an anæsthetic was heralded with the utmost degree of enthusiasm, and its marvellous effects as a pain obtunder were pictured in glowing colours. Now, however, it is to be observed that the enthusiasm has spent its force, and to the enthusiastic the picture has lost much of its brilliancy. Imagination has played a prominent part in both directions, and *imagination* wields powerful influence for good or evil among mankind.

ORIGINAL RESEARCH IN DENTISTRY.—We understand that the considerations of the possibility of a plan is under consideration by the Illinois State Dental Society whereby Professor Black, whose researches are so well known, may be enabled to devote himself solely to the purely scientific side of his profession, and be freed from the anxieties and trammels of private practice.

PROPRIETARY ANÆSTHETICS.—Recently America has been victimised by a plague of proprietary anæsthetics. Some preparation of chloroform or its congeners flavoured up and are then sold to a confiding public as a safe anæsthetic. No narcotising agent is safe, and hence the grave danger threatening those who, gulled by a mendacious puff, have resource to some quack nostrum warranted to relieve pain or remove consciousness without putting the patient in any danger. The *Dental Cosmos* has done good service in causing various proprietary anæsthetics to be analysed, and by cautioning the public against their use. We heartily agree with all our contemporary says, and join in the emphatic censure of the practice of selling dangerous medicines under fancy names.

HYPODERMIC INJECTIONS OE SALICYLATE OF COCAINE IN NEURALGIA.—Dr. Max Schneider has, according to the

Lancet, successfully employed subcutaneous injections of 0,4 gramme (about a quarter of a grain) of salicylate of cocaine in the case of a woman suffering from a third attack of severe neuralgia affecting the second and third divisions of the fifth nerve. Her first attack, which occurred five years previously, had been cured by large doses of quinine. The second attack lasted nearly six months, and was quite unaffected by quinine, but ultimately yielded to morphia and iron. The third attack had already lasted for four weeks, when the author commenced the use of the cocaine. He injected it into the right cheek eight times in six days, the puncture giving no pain, and being followed by no unpleasant effect. This was followed up by the employment of the constant current, the anode being applied to the painful spots, which corresponded with the points of exit of the branches of the nerve, and the cathode to the neck. The relief from pain and from the consequent insomnia afforded by the cocaine was remarkable, and Dr. Max Schneider thinks that this method of neuralgia is well worth further trial.

PROFESSOR HUXLEY ON SMOKING.—Professor Huxley, in a certain debate on smoking among the members of the British Association, told the story of his struggles in a way which utterly put the anti-tobacconists to confusion. "For forty years of my life," said he, "tobacco had been a deadly poison to me. (Loud cheers from the anti-tobacconists.) In my youth, as a medical student, I tried to smoke. In vain. At every fresh attempt my insidious foe stretched me prostrate on the floor. (Repeated cheers.) I entered the navy. Again I tried to smoke, and again met with defeat. I hated tobacco. I could have almost lent my support to any institution that had for its object the putting of tobacco smokers to death. (Vociferous cheering.) A few years ago I was in Brittany with some friends; we went to an inn; they began to smoke and look very happy, and outside it was very wet and dismal. I thought I would try a cigar. (Murmurs.) I did so. (Great expectations.) I smoked that cigar—it was delicious! (Groans.) From that moment I was a changed man, and now I feel that smoking in moderation is a comfortable and laudable practice, and is productive of good. (Dismay and confusion of the anti-tobacconists. Roars of laughter from the smokers.) There is no more harm in a pipe than there is in a cup of tea. You may poison yourself by drinking too much green tea, and kill yourself by eating too many beefsteaks. For my own part, I consider that tobacco, in moderation, is a sweetner and equalizer of the temper." (Total rout of the anti-tobacconists and complete triumph of the smokers.) The yarn was spun by the *Medical and Surgical Reporter* from which we copy.

THE RELATION BETWEEN INFLAMMATION OF THE GUMS AND DISEASE ELSEWHERE.—The origin of the various skin eruptions, vomiting, convulsions, diarrhœa, and constipation, so frequently found to be coincident with the process of dentition in children, is, in the opinion of Koczorowski, to be sought less in the condition of the teeth than in that of the gums. The author, quoted by the *Medical News* impressed with the idea that the essence of most inflammatory processes consists in an infection by micro-parasites, proceeded to treat the swollen gums and cavity of the mouth with a solution of tincture of iodine, in common salt (chloride of sodium, 1 per cent. ; tr. iod., 0.5 per cent.). A half to a teaspoonful of this solution, according to the age of the child, is applied every quarter or half-hour. He found that, simultaneously with the paling of the gums, the concomitant catarrh of the respiratory and digestive mucous membranes, the feverishness, and the reflex nervous phenomena came to an end, without the use of other means than a simple purgative. Further observations of this connection between diseases of the gums and other affections led the author to apply the same treatment to adults. That the cavity of the mouth, which is the great entrance gate through which organisms find their way into the body, should be first attacked by them is not surprising ; swollen gums form a suitable nidus for their development. A receptive state of the mouth is produced in children by the mechanical injury done to the gums by hard teething-rings, and in adults by artificial teeth, plates, and the like, and by chemical substances. But the greatest share in the process is played by the teeth. They irritate mechanically when they are decayed, chemically when they are foul, and functionally during their eruption.

Abstracts of British & Foreign Journals.

THE JOURNAL OF THE BRITISH DENTAL ASSOCIATION.

A FEW NOTES ON SOME IRREGULAR DENTAL TISSUES.

By A. A. Matthews, L.D.S.

The subject of this paper is the consideration of irregularity of dental structures occurring during the stage of development. The first section described is gemination between a first upper molar and a supernumerary tooth. The root of the supernumerary coalesces with one root of the molar, forming a hollow cylindrical root, the dentine of which is coated within and without with cementum ; the crowns of the two teeth are blended so that the individual teeth can be distinctly traced. A process of pulp extends from the main pulp cavity in the molar, across into the supernumerary and down the outermost portion of the round cylinder root. From this irregularity of the tissues results.

Besides the usual outside coating of enamel above the gum line, there is a thick layer which blocks the end of the large cylindrical root where it is connected with the body of the tooth, the remaining lining of this abnormal root is cementum, and this must have been contiguous to soft tissue when the tooth was in its socket. This portion of enamel is well formed and could be imagined an ordinary layer, it is however very imperfectly joined to the dentine, having a scalloped appearance where the two tissues unite. This enamel in such an unusual situation evidently belongs to the supernumerary, and in the complication of the structures during development, has become enveloped in the dentine, which forms the cylindrical root.

At the union on the masticating surface, between the supernumerary and molar, a deep depression exists, its floor is a bridge of enamel which assists in enclosing a space all about this neighbourhood ; the dentine and enamel are very imperfectly formed, having many irregular spots intermixed, which the writer thinks are very large interglobular spaces.

A particle of cementum is decribed as existing directly above the pulp chamber and underlying the radiating dentinal tubes.

The next case recorded is an example of dilaceration in a permanent central incisor. This tooth has a well-formed normal root, and is normal as far as the neck, at this point the crown is carried backwards, so as to make the labial surface lie at right angles to the long axis of the tooth. In spite of this unusual position, there are evident signs of wear from contact with the lower teeth. The writer considers it possible for the bite so to strike the forming upper incisor as to cause this deviation. Very often the lower incisors are developed in advance of their upper antagonisers, hence, possibly, an upper incisor may become interrupted by contact with the lower incisor, striking it in such a manner as to prevent it cutting properly through the gum, and as it were bending it on its axis.

A longitudinal section reveals a break in the uniformity of the structures consists of dipping in of the cementum into the dentine ; above this point the dentine is covered by enamel and below by cementum.

Evidently the crown has been bent over until the tissues gaped on the convex side, and this gaping has been filled in with cementum, and the dentinal tubes can be seen folding round this, whilst endeavouring to reach the enamel. On the concave side of the flexure nothing abnormal exists beyond a considerable curving of the dentinal tubes.

An odontome is next considered, it came from a male patient, aged 27, it appeared as if a broken tooth was buried in the gum, under which the hard substance could be felt with a probe. It was concluded the hidden body accounted for the swelling and pain which the patient experienced, so an incision was made over it and after some little difficulty the odontome was dislodged.

A section taken through the centre of the long axis, shows the confusion of the tissues, as the enamel and dentine are considerably intermixed and these tissues constitute the mass, various kinds of dentine are found in the specimen finely tubed ; finely granular secondary dentine, and areolar dentine also very plainly seen. Dentine forms the external margin, as the enamel comes to the outline in small portions only and in a few places. There are one or two small places left for pulp tissues, judging from the amount of secondary dentine, the mass has been interspersed with channels of pulp, many of these tracts of secondary dentine have dentinal tubes radiating from them, there is a formation of a series of pouches in this as in other odontomes which in this instance occupy nearly a central position, the more perfect examples having what appears to be fine granular dentine in the centre, then outside this, areolar dentine, surrounded by tubed dentine, which contains some irregular black spaces, and outside this again, a fringe enamel.

In other positions there are areas of well formed tubular dentine, and tubes can also be seen passing over interglobular spaces, without suffering any interference.

Cementum is generally absent in odontomes, when the whole of the tooth substance is involved, but is present in *odontomes coronaires* and *radiculaires*, possibly these abnormalities are due to something erratic in the definition of the investing tooth follicle with only a partial investment, when the odontomes are connected with the crown or root alone.

The last specimen is a supernumerary. In longitudinal section from normal single root, there stretches out a forked crown in two unequally sized portions, which are often the whole length of the crown, and the pulp cavity can sometimes be seen bifurcating at the level of the necks of the tooth and finding its way into both portions of the crown, but the small portions may be completely calcified.

The tubules in this part of the dentine branch upwards from the pulp cavity, on their way to the enamel, and the enamel can be traced lining the open cavity in the crown, this becomes considerably reduced in quantity at the deepest portion. The writer proposes to account for the deep folding of the enamel by supposing it to be a failure on the part of the enamel organ during development to coalesce at the mouth of the cavity, and so has wandered down over the denture whereas if it had succeeded in uniting the denture would have filled in most of the space.

THE INDEPENDENT PRACTITIONER.

CALCIFIC DEPOSITS IN TOOTH PULPS.

By Edgar D. Swain, D.D.S.

The pathological changes of tooth pulp are many, and of great importance.

The changes considered are calcifications, such as are better known as osteo-dentine, reparative dentine and calcifications, such as are better known as osteo-dentine, reparative dentine, and calcification islands or pulp stones ; these last are supposed to be the cause of prolonged and sometimes acute odontalgia. At present, however, we are unable to diagnose the presence of such in the pulp.

Having collected nearly 400 extracted teeth, he divided them into four different lots, classifying them according to the external evidences of disease. Two hundred were badly decayed, with pulps either largely exposed, or such as would have been had the carious matter been removed ; nearly all had evidently been the cause of terrible suffering. Another hundred being selected less diseased with pulps not exposed, except in a very few instances where the caries was penetrating, with less superficial territory involved.

The third lot consisted of sixty teeth, slightly carious, or showing worn or crushed proximal surfaces, evidences of exposed cementum to a greater or less degree, by absorption of surrounding tissue. The fourth lot, twenty in number, exhibiting few signs of disease, and had presumably been extracted in the preparation of mouth for dentures, or for the purpose of regulating remaining teeth. Dr. Swain points out he was then searching not for microscopic changes but for what was then called calcified pulps, or what are known as pulp stones. These teeth were broken into pieces as carefully as possible, in order to preserve all fragments. The result, showed however, was as follows: The first two hundred produced eighteen calcific deposits of greater or less size; the third hundred furnished eleven, the third lot added five, and the fourth lot added three. Believing that some, less affected than the thirty-seven mentioned, had escaped observation, he estimates the number thus diseased at twelve per cent., which was probably a very low estimate. Dr. Swain examined elephant tusks with the view of finding evidence of reparative dentine. While examining a tusk he discovered within its cavity portions of the pulp desiccated, and upon tearing it away a calcific deposit was found about the size of a marrowfat pea within. Sections prepared from this nodule presented, under the microscope, the same characteristics as those from human teeth.

Mr. Salter obtained from a dissecting room thirty-four teeth, unaffected with caries, all bearing evidence of disease or injury, past or present.

Vertical sections of these discovered that every tooth showed signs of calcific deposits in its pulp. Microscopical examinations showed Dr. Swain that although his sections resembled normal dentine in many ways yet, the apparent canaliculi were not those of regular formed or developed dentine, and they presented also a lamellated appearance, indicating that they were built up in layers from the centre outward. He decalcified with diluted hydrochloric acid, leaving unaltered organic matrix which presented very nearly the appearance of normal pulp tissue.

He then considers the authorities on the subject. Hunter speaks only of the dentine of repair in teeth worn away by attrition, and makes no mention of pulp stones.

Oudet mentions two kinds of secondary dentine, viz., adherent and unattached; the latter, most likely, referring to pulp stones. Both conditions he believed to be the result of irritation to the dentine by attrition.

Heitzman says: "The process leading to their formation is by no means a mere deposition of lime salts, but a transformation of the pulp tissues. That they are partly, at least, identical with lamellated dentine, and are often devoid of dentinal canaliculi."

He believes them to be the product of a low inflammation of the pulp tissues.

Wedl thinks these are formations from an inversion of the odontoblasts into the centre of the pulp tissues, and says:

"The outer surface of the pulp tissue is covered with odontoblasts, from the broad faces of which, directed outward, extend comparatively thick processes entering the dentinal canals; while the basis tissue of the pulp consists of loose connective tissue." And he maintains the theory of inversion occurring in the layers of dentinal cells; that the calcareous grains are true concretions occurring in connection with hard, new formations, but never enter into organic union with the original dentine; they are situated within the mass of the pulp tissue and are calcareous or calcifications in the connective tissue.

Criticising these views Dr. Swain says: we have the anomaly of the odontoblasts joined to the dentinal canals by strong processes projecting from their outer ends, enclosed within strong walls built by themselves, becoming inverted by a force which must exist within themselves, and depositing into the connective tissue calcareous grains intended for true dentine, as would be the case if the odontoblasts maintained their normal position. Were this true we should find zones of dead or insensitive dentine, which would be of great assistance in diagnosing the presence of these deposits within the pulp. On the contrary teeth thus affected are often hypersensitive.

Salter attributes this change in the pulp to trivial causes, the tooth having been injured or irritated, the pulp of a young tooth, he adds, perfectly matured never exhibits this condition unless it has received some abnormal stimulation from morbid change or mechanical injury of the dentine, the most potent cause being caries. Heitzman asserts pulp stones are seen in perfectly developed bicuspids, extracted before full development.

Salter here implies calcific nodules in dental pulps are very common. He describes pulps in which a great many appear, and the conditions which indicate the fusion of numbers of small nodules into one large one, sections from which have the appearance of numerous small lamellated bodies. He states further, that the whole of the tissues, cells, nuclei, connective tissue, blood vessels, and a multitude of nerves are swallowed up by the process of calcification. Other authorities confirm those already given. Delafield and Prudden are quoted in describing ordinary calcareous degeneration. Calcification occurs in parts of tissues which are dead, or in a condition of reduced vitality, the result of some antecedent morbid process, usually of an inflammatory nature. Calcific deposits, such as have been spoken of, are not confined to the tooth pulp alone. Similar conditions exist in veins.

Dr. Swain has arrived at the following conclusions.

(1). Pulp stones are never connected with the dentine, a layer resembling a dead or desiccated membrane always intervening. This membrane evidently consists of atrophied odontoblasts, and consequently unable to appropiate and deposit the lime salts which blood supplies. Still, the salt thus liberated are organised into islands of calcification in the body of the pulp, surrounding the fibres and vessels, thereby giving the appearance sometimes observed indentinal canals. Another class of pulp stones resembling true bone are the result of a transformation of connective tissue cells into osteoblasts, which sometimes entirely obliterate the pulp cavity. This kind of pulp calcification, the writer thinks, never occurs in a fully developed tooth, but commences at that period when the apical foramen is large, and the exciting cause is the osteoblasts, which produce the cementum. Their influence over connective tissue cells transforms them into osteoblasts, which appropriate the lime salts intended for dentine and obliterate the pulp cavity by filling it with cementum.

Soluble salts of lime when mixed with some precipitant are formed to vary as to the form the precipitate takes according as gelatine, albumen, or other kindred organic compound be present.

Summing up he explains his theory. First, that the odontoblasts have become atrophied and are no longer capable of performing their normal functions.

Second, that the circulation at the time of their formation is normal and the necessary amount of lime salt is conveyed into the pulp when required either for the purpose of building dentine in tooth development, or dentine of repair, but the atrophied odontoblasts, being incapable of appropriating them for either purpose, it is therefore deposited within the tissues of the pulp.

Third, that the lime salts having been passed by osmotic forces out of the coats of the vessels, and not being appropriated, and no endosmotic force being present (because of the otherwise normal conditions), meeting with the necessary organic material in the form of albumen the two unite as in the experiment.

SOUTHERN DENTAL JOURNAL.

ETHICS.

By John C. Story, M.D., D.D.S.

The writer does not propose to offer a Code of Ethics for the profession, but to give some views of his own upon the subject.

Ethics is defined to be that "science which treats of human actions and mental affections, considered as virtuous or vicious, right or wrong ; moral philosophy ; morality ; morals."

He considers the following heads : (1) The relations of the dentist to his patients, and *vice versa*, of patient to dentist.

(2) The relation of the Dentist to his profession.

(3) The relation of the dentist to the community at large.

Under the first head he points out the importance of having office appliances absolutely clean, while personal cleanliness is also insisted upon. Of course a dentist's first duty is to know his profession thoroughly—this goes without saying.

The bearing of the dentist towards his patient is next considered. A manner mild and gentle—even persuasive, is advocated. While dealing thus with his patient, he should proceed with firm and resolute determination ; boisterous conduct should never be permitted to enter the office—a little well-placed politeness covers a multitude of defects. During the operation he should amuse the patient with some anecdote as foreign to the subject of dentistry as possible. This would tend in a manner to divert the patient's mind, and enable her to endure what would otherwise be a much dreaded and painful operation. He should always keep a book in which to register his appointments, at the same time furnishing the patient with a card with the appointment marked on it.

Of the patient's duty to the dentist he says :

The patient should keep the appointment punctually.

Seated in the chair, the patient should submit quietly to whatever operation may be deemed necessary at that sitting ; the dentist knows what is best to be done. Suggestions from the patient are said to be entirely out of place and unnecessary. The patient is advised to suit his dentist's convenience as much as may be, and should any imperfections in his work occur, to acquaint the dentist of it without fuss.

When a patient changes his dentist he should call on the former one, giving the reasons for the change, and pay him for the services rendered. It is best to all to have a definite understanding regarding the fee, as to the probable amount, before the work is done. The dentist alone being capable of estimating the value of his services, must fix the fee for each operation ; and as paid-for dentistry always gives satisfaction, it is clearly the duty of the patient to settle the bill when the service is rendered.

Each family should have its dentist, who should be regu larly consulted by each member, and especially the children, that their teeth may have his early attention, and his instructions should be followed to the letter, thereby preventing much unsightly irregularity and deformity, as well as arresting early decay and consequent loss of teeth. For obvious reasons, the family dentist should not be changed.

The duty of the dentist to his profession.

The first duty of every dentist is to promote the honour and dignity of his profession.

The dentist must be most circumspect in his dealings with his lady patients. They should feel as safe in his consulting rooms as they are at home. The dentist should be temperate in all things, his calling requires a clear head, an undimmed eye, and a steady hand. To his fellow-practitioner he should be kind and courteous.

When called upon by the patient of another dentist, from whatever cause, duty requires him to treat the case temporarily, and refer the patient back to his former dentist. Should the patient express a desire to discontinue his services, and wish the new dentist to proceed, he is at liberty to do so.

A voluntary examination of the work of another dentist, with an expression of opinion, is against all etiquette and professional morality. When called upon to do so for any cause, by the patient of another dentist, always name and demand the fee in advance; this being refused, you should refuse your services.

All flaming advertisements, cards, or handbills, calling special attention to modes of operating, the purchase of some instruments, or the introduction of some particular style of work are to be reprobated.

It is especially humiliating and degrading to the profession for one of its members to stand in front of churches, theatres, or any place of public resort, and distribute such circulars, handbills or cards.

A simple card, bearing the name, occupation, and place of business, meets all the demands of proprietary.

To the community in which he resides, the dentist should be a quiet, peaceable, law-abiding citizen, discharging his obligations alike to both, and while he may not be called upon personally to take part in public matters, he should always be found lending his influence to the side of right, as well as using his best endeavours to prevent wrong.

DENTAL JURISPRUDENCE.

By. R. B. ADAIR, D.D.S.

The same rules and laws apply to dentistry and dentists as apply to surgeons and physicians. A case is cited. The dentist extracted a tooth for his patient under gas. A piece of the tooth flew down the trachea, causing pain and suffering for four weeks, when it was coughed out. The patient was awarded £100 damages.

The judge, in his charge in that case, said: The law holds that no person should assume extra responsibility in the management of any case without bringing to the same a corresponding amount of skill to meet emergencies. The same holds true, said the judge, regarding every step in any operation, the surgeon being bound to exercise his best judgment, his most watchful care, and greatest skill, for the benefit of his helpless and trusting patient.

From the above ruling, it is clearly shown that the dentist would be liable for any other operation in dentistry unskillfully or negligently performed. Under this ruling, if a dentist should extract two teeth at once, as has frequently been done, or extract a tooth that should be saved, or make a mistake and extract the wrong tooth, or should fracture the jaw, or let his instrument slip and fracture a sound tooth, he would be liable for damages. If he should put arsenic in a tooth, and use too much, and fail to properly seal it up, and it should escape from the tooth and destroy the alveolus and part of the jaw, and cause pain and suffering he would be liable for damages. If a dentist should improperly fill teeth, by filling continuously from the proximal cavity across the space between the teeth, and into the other cavity, and about double the quantity of amalgam or filling material packed under the margin of the gum, causing pain and suffering he would be liable. If he should contract an artificial piece in such a manner as to cause absorption and flabbiness of the ridge, or inflammation of the mouth he would be liable.

The dentist has no right to extract a tooth just because his patient wants it done, or to perform any other operation unless it is best for the good of the patient. It would be his duty rather to refuse to render such services than consent to perform any operation which in his judgment is not best.

Literary Notices and Selections.

THE PERILS OF PRACTICE.

By Geo. L. Parmele, M.D., D.M.D., Hartford, Conn.

(*Continued from page 611.*)

Members of our profession are no exception, and I frequently hear them say, "I cannot afford to lose time." There is nothing they can better afford to do. The time spent in frequent outings, breathing "God's oxygen," is not lost, for owing to renewed vigour restitution is obtained for the seeming loss of time, by the larger amount and better quality of work accomplished in the remaining hours of labour. "I have sinned against my brother, the ass" (referring to his abused body), were the last words of St. Francis, of Assisi, when his self-inflicted martyrdom brought him to death's door.

We should all make a business of pleasure and recreation of mind and body. All medical men, who have given the subject any thought, agree as to the increase of nervousness in Americans, due to the chronic habit of constant excitement and push in our daily life, at home and abroad, sick or well. To hit the happy medium between under and overwork is no easy task. Many are injured by too little work. When what was once considered a cheerful task requires an extra effort for its accomplishment, and, as a direct outcome of a worried and flagging brain, errors and omissions commence to manifest themselves, it is a sad mistake to spur up the exhausted brain to increased vigour by artificial means. "That which one desires to do must not be his guide, but that which he has power to do."

So long as a brain worker can eat and sleep well, and takes abundant exercise in the open air, it is not necessary to impose special limits to his working hours. Bnt when one begins to worry over business affairs, and about the numerous personal perplexities which we can seldom escape, his brain constantly contriving some way out of the difficulties which beset him admits of no quiet for sleep. Lack of the necessary rest soon disturbs the nervous system, and is quickly followed by dyspepsia and fits of depression, two of the principle miseries of an overworked body.

After all, it is worry that does the harm rather than work. I once heard the late Dr. Beard say that the three W's, Wine, Women, and Worry, were the most fruitful causes of nervous shipwreck and insanity. I would not have you infer that I desire to picture dentistry as the most onerous of all labour, or that all who enter upon it, are on a sure road to an early grave. Far from it, for I believe a properly conducted dental practice is one of the most pleasant of all special fields of labour. Still, there are circumstances connected with it which tend to render it particularly dangerous to those who go at it with too much push, and who neglect every hygienic law. The same amount of push would be much less injurious in many other occupations.

You all ought to know "what to do to be saved" better than I can tell you, and it seems unnecessary for me to lay down the laws of health. I only wish to spur up those who need it to a proper observance of those laws, and particularly to urge them to shorten their office hours, to take frequent holidays and outings, to devote themselves to some hobby which requires active exercise in the open air, and, in fact, for those inclined to overdo, I advise a cultivation of laziness as to business, and activity in all open air life.

The surest of all prophylactics is active exercise in the open air. Air is a part of our daily food, and by far the most important, the purity of our blood depending upon it. Jean Paul says: "On the day of judgment God will perhaps pardon you for starving your children when bread was dear, but if he should charge you with stinting them in his free air, what answer shall you make?"

Physical exercise, by accelerating the circulation of the blood, stimulates the activity of all those internal organs whose functions conjointly constitute the phenomena of life and counteracts innumerable functional disorders, any one of which is sure to react on the nervous system.

Mirth is of value as a remedy. Men of a cheerful disposition are generally long lived, and anything tending to counteract the influence of worry and discontent contributes directly toward the preservation of health.

See to it that your offices and homes are in a proper sanitary condition, and let me suggest, where practicable a reversal of the general rule, and that you make your operating rooms large and airy, and your reception rooms, if necessary, the smaller of the two.

Never eat until you have time to digest, for we are not nourished by what we eat, but by that which we assimilate.

Plenty of rest after meals is a good health rule. Wild animals, in obedience to instinct, seek out their hiding places after a heavy meal, and digest in peace. Let us follow their example. Digestion requires leisure. By attempting work while the stomach is full, we are not only unjust to ourselves, but also to the labour we desire to perform.

In closing, I thank you for so patiently listening to this brief and unsatisfactory address. Let me also once more thank you for the compliment shown in bestowing upon me the highest honour in the power of this society. I feel deeply conscious of duties unfulfilled, for which I ask your forgiveness, but it is a pleasure to think that when I resign this chair it will be to one whom I feel sure will not disappoint your most sanguine expectations.—*Independent Practitioner.*

CARIES AND NECROSIS OF ALVEOLI OF RIGHT SUPERIOR MAXILLA AND CHRONIC INFLAMMATION OF ANTRUM, DUE TO EXCESSIVE SALIVARY CONCRETIONS AND A NEGLECTED PULPLESS MOLAR.

By B. Merrill Hopkinson, D.D.S., M.D. of Baltimore.

I have had in the course of my practice during the past few years, what would seem to be, to judge from the experience of others, a large number of cases of diseases of the maxillary sinus. With few exceptions, the disease has been devoid of active symptoms, at the time I found it, the inflammation being of a chronic nature and showing itself either in the nasal cavity, or in the throat, rather than in the oral cavity and in connection with the dental organs. I have generally discovered these troubles in operations upon the teeth, either in extractions of teeth or roots, or in the treatment of these organs when in a pulpless state. The finding of incrustations of salivary calculus upon the teeth is of daily, almost hourly occurrence, and it is most surprising how great the accumulation may be, without ordinarily producing serious injury. The appended case, of which I give a record below, is one of those rare instances where caries and necrosis of the alveoli, together with antrum disease and its attendant evils, may be caused by great accumulation of calculus, complicated with a neglected pulpless tooth. I have never seen a similar case recorded, and I think it most interesting for several reasons. I wish it were possible for medical men in general practice to be a little better acquainted with the diseases treated by oral specialists. It would indeed be a good thing for suffering mankind, and I am sure that thousands of patients would yearly save their valuable organs of mastication, and also be saved a great amount of unnecessary pain if such were the case. I have my attention called to this defect of education, as well as of study, time and again; and in the case below the young man had been variously treated, without lasting benefit of course, for general debility, malaria, &c., *ad infin*, before I was so fortunate as to discover the true cause of his trouble when he applied to me for oral services. The usual symptoms of antrum disease were absent ; there did not seem to be any special indication, from an oral inspection, that would lead one to anticipate the finding of a bone lesion ; indeed it was an obscure case, and yet the simple removal of salivary incrustations, as well as a tooth broken down with caries and and containing a dead pulp, made the diagnosis clear, and placed the man in a condition to recover his health and strength. I would most respectfully suggest that general practitioners pay more attention to the condition of the mouths of their patients, and advise a more frequent calling upon the dental surgeon ; for I am fully convinced from experience and observation that nine-tenths of those suffering from general maladies would be greatly benefitted by such visits, and the services of each would aid the other.

Mr. S., office clerk, a bilious-nervous temperament, age 21, consulted me June 18, 1885, concerning his oral cavity, which was sadly in need of treatment. Notwithstanding the fact that he is a young man of good education and surroundings, he had neglected his mouth in a shameful manner, the result being vitiated secretions, most imperfect mastication and consequent indigestion, and a general condition of ill-health. He complained of pain of a general character, and it was difficult to localize any particular lesion, on account of the wretched condition of a number of teeth, and the fact of there being no special soreness or tumefaction present ; but from symptoms as described, and having found pus mixed with the nasal secretions, and detected a bad odour not due to carious teeth, I diagnosed, together with dental troubles, disease of a deeper seated nature than that of simple caries of these organs, and began to look elsewhere for the principal seat of his difficulty. After careful examination into his history I eliminated specific disease. He was very anœmic, complained of weakness, anorexia, and inability to apply himself steadily at his avocation ; was habitually constipated ; and thought as most of the sick laity do in these days that he was suffering from aggravated Bright's, and was generally miserable and depressed. A prominent symptom was profuse and obstinate epistaxis principally from the right side, that nostril being almost continually occluded, save at these periods. I immediately proceeded, as the first step in local treatment, as well as an aid to diagnosis, to condemn and advise the extraction of seven teeth, and having the concurrence of my patient commenced operating. I removed five teeth with the patient in a conscious state, and without the aid even of a local obtundent, but as soon as I arrived in turn at the superior right second molar, he suddenly refused most positively to have me go on, saying that he had an indefinable fear of having that and the adjoining tooth removed, unless he was first rendered unconscious. There was no external evidence of disease, save enormous incrustations of salivary calculus, and unhealthy appearance of the gums, due to that cause ; but, persuasion being useless, I allowed him to inhale a suitable quantity of nitrogen monoxide, and, first having removed a sufficient amount of calculus, applied the forceps to the second molar and with surprising ease removed it, brought with it an inch of the alveolar border, loosened the third molar, and left the gums hanging like two curtains uninjured. I immediately removed the third molar, which brought with it a portion of diseased alveolus, leaving the gums as before, there appearing to be no connection between them and the bony parts which came away.

Immediately following extraction came a profuse flow of blood mixed freely with offensive pus, giving unmistakeable evidences of necrosis. His reaction, as is the rule when N 2 O is administered, was rapid, complete and satisfactory. I explained to him the condition of affairs and commenced a careful examination with a view of discovering the extent of the disease. I found I had removed the alveolar border entire, down to the body of the bone to the extent of about one and one-half inches. I proceeded to remove all further discoverable portions of carious bone, carefully washed the parts with a carbolized solution, and in continuing my examination found that a probe could be easily passed through quite a large opening into the antrum and injections through the opening found their way most readily into the nasal cavity. I found here then the seat and principal cause of all his trouble. This state of things had evidently existed for some time and he was quite unaware of any disease of the parts, anything more than a general uneasiness which he attributed to a carious tooth. The removal of the calculus and tooth removed, of course, the cause of the disease, made a diagnosis sure, and laid the foundation for permanent general improvement. Everything seemed favourable for successful local treatment, the tendency to hæmorrhage seemed *nil*, there being very little bleeding since the first gush after removal of the teeth, and after thorough injections with a tepid carbolized solution, two per cent., a suitable dressing of absorbent cotton, saturated with the solution to keep the wound patulous, permit drainage and prevent sepsis, which dressing the pendant gums enabled me to apply satisfactorily, I dismissed him for the day, and enjoined him to remain as quiet as possible and to return next day. Before leaving I prescribed a pill to be taken daily, or on each alternate day as required, at bed-time, containing res. podophyl gr. 1-5, aloes aq. ext. gr. $\frac{1}{3}$, to regulate his bowels, told him to bring me a sample of urine for examination, which I afterwards found to be normal, and this fact enabled me to aid him in dismissing from his mind the awful bugbear of morbus Brightii. On the following day, I found that he had disobeyed my injunctions to keep quiet, and had managed to get my dressing displaced, and in so doing had caused a slight hæmorrhage which alarmed him, and he applied immediately for professional services in the locality in which he happened to be. My worthy friend and brother succeeded in stopping the hæmorrhage, and also, in doing just that which I desired most to avoid, viz : using a solution of an iron salt, and plugging up the cavity so tight that proper drainage was completely arrested, and my young man presented himself in a sorry plight with a very swollen face. I removed the great mass of cotton causing hæmorrhage again, but it was easily overcome by tepid injections, thoroughly injected the antrum and other diseased parts with solution as before, renewed the dressing of the previous day, and also my injunction as to quiet. I am of the opinion that the use of Monsell's solution as a stypic is seldom required in oral, or indeed in general practice, and it should be avoided when possible, the formation of an insoluble clot followed by sloughing naturally causing a retardation of the healing process. The same local treatment was continued for nine days with very satisfactory results and the progress towards recovery was remarkably rapid. The pills operated very kindly and after four days it was only necessary to repeat them on each alternate day. I prescribed for him tr. ferri. muriat. gtt. x et quiniae sulph. grs. ij to be taken thrice daily; at the end of the nine days I omitted the dressing, previous symptoms had disappeared, and he was in condition to have seventeen fillings inserted in his remaining teeth, which operations I commenced shortly after.

On October 29, or a little over four months from first operations, I inserted for him a partial superior denture, filling all vacancies, which he is wearing with much comfort, and is now in full possession and enjoyment of good health. The diseased tooth I found upon examinationn to contain a mumified dead pulp, the roots were greatly exostosed, in fact were three times their normal size, judging from the size of roots of his other teeth, were firmly adherent to their alevoli, and the palatine root had evidently penetrated the antrum. There were no signs of alveolar abscess. This case demonstrates clearly two things: first, that excessive salivary concretions may do a great deal of harm, though such cases are most rare, and that when calculus is present upon the teeth it should invariably be removed. Secondly, that it is dangerous to leave a pulpless tooth in the dental arch *unattended to.* I will say in conclusion that the latter class of teeth, of which the dentist finds a great many, may *by proper treatment* be made wholly innocuous, and put in a condition to perform their proper functions with perfect comfort and satisfaction for an unlimited number of years. I speak decisively and authoratively on the subject of pulpless teeth, from the fact that I have read during the past year extracts from papers of a prominent physician in which he condemns what *he* calls "*dead teeth*" in a wholesale and finished manner. Such condemnation is not due to ignorance, but to lack of critical examination of the subject. Pulpless teeth are not *dead* they have only lost their inner life, that of the pulp, and still receive adequate nourishment through the periosteum to preserve their vitality, in part, indefinitely. If they were *dead*, the condemnation of my learned brother would be just, and if not removed by the specialist, nature herself would not tolerate them, but would cast them off as bodies foreign to the animal economy.—*Md. Med. Journal.*

Dental News.

BRIGHTON DENTAL HOSPITAL.

Opening Ceremony.

The Brighton, Hove, and Preston Dental Hospital, situate in Marlborough Place, Brighton, was publicly opened on July 2nd. The institution is a small, unpretentious building, having been converted from a dwelling-house to its present purpose. The waiting-room is entered from the corridor, and here ten or twelve persons may be comfortably seated awaiting a summons to the operating-room, which also looks out upon the front. In the centre of the room is a handsome moveable chair, presented to the institution by Mr. O. A. Fox, the anæsthetic apparatus being close handy.

The patrons are the Mayor of Brighton (Alderman E. J. Reeves), the Right Hon. W. T. Marriott, Q.C., Sir Robert N. Fowler, Bart., and Mr. W. Percival Boxall, J.P., Alderman D. Smith, J.P., D.L., has been elected President, and Mr. T. Billing, Dr. Ewart, Mr. S. Bevan Fox, L.D.S., Colonel Tester and Mr. Marriage Wallis, Vice-Presidents. The Committee of Management comprise the Rev. T. H. Rhys Evans, Mr. J. Grinstead, Mr. J. R. Gwatkins, Mr. J. G. Harrison, Mr. D. Thomas, and Mr. J. Wells, whilst the honorary medical staff consists of the following :—Consulting surgeons, Mr. G. F. Hodgson, M.R.C.S., Eng., and Mr. F. W. Salzman, M.R.C.S., Eng. ; administrators of anæsthetics, Mr. E. J. Tulk Hart, M.R.C.S., Eng., and Mr. W. J. Stephens, L.R.C.P. ; consulting dental surgeons, Mr. O. A. Fox, L.D.S., and Mr. W. A. Poundall, L.D.S. ; dental surgeons, Mr. E. T. Ash, L.D.S., Mr. D. E. Caush, L.D.S., Mr. W. Harrison, D.M.D., L.D.S., Mr. S. P. Johnson, L.D.S., Mr. C. B. Stoner, D.D.S., L.D.S., Mr. John Wood, L.D.S., and Mr. W. R. Wood, jun., L.D.S. Mr. J. Wood has been elected treasurer. Mr. W. Harrison hon. secretary, and Mr. G. Potter assistant secretary and collector. The proceedings commenced with a meeting, held in the King's Apartments, Royal Pavillion, Brighton. Dr. Joseph Ewart presided, and amongst those present were Mr. E. T. Ash, Mr. D. E. Caush, the Rev. T. Rhys Evans, Mr. O. A. Fox, and Miss Fox, Mr. Walter Harrison, Mr. J. G. Harrison, Mr. R. Harrison, Mr. Hales and Miss Hales, Mr. S. P. Johnson, Mr. E. Norris, Miss Peckover, Miss Pollard, Mr. Pointer, Mrs. Pointer, and Miss Pointer, Mr. C. B. Stoner, Mr. D. Thomas, Mr. J. Wood, Mr. I. Wells.—The Secretary said the reason they had not met at the hospital was owing to the smallness of the rooms, which could not hold such a number of visitors as they had with them that day.

The Chairman, who was received with applause, said there was no institution of the kind, he believed, in the town. This department of surgery was now recognised in the practical form it ought to be. They had a dental surgeon attached to the Children's Hospital, and the work was carried out by Mr. Harrison to the fullest satisfaction of the staff of managers to that noble institution. Time was when these special branches of surgery and medicine were not recognised, but we had now in various parts of the country a department of surgery devoted entirely to diseases of pathology and diseases of the eye. We had in Brighton, even, a very excellent institution, founded a few years ago by a few enthusiastic medical practitioners—the Throat and Ear Dispensary in the

Queen's-road. That was an institution which was doing a very noble and useful work amongst the poorer classes of the community. Then they came to the next speciality to which he would make allusion, and that was the one that had called them there that day for the purpose of promoting its interests to the best of their ability. He meant the new Dental Hospital, the opening of which they were met to inaugurate that day. Dentistry, in his earlier days, was a special department of the profession, which had not risen to the eminence to which it had now attained. The cleaning and extraction of the teeth, the repairing of the teeth, and the insertion of new teeth to take the place of old ones which had been extracted was the sum and substance of what was called the practice of dentistry not more than a generation ago. Now they found members of the dental profession and of this branch of surgery, had to undergo a very severe preliminary training which qualified them for membership of the Royal College of Surgeons. Thus they had to study those collateral branches of medicine and surgery which enabled them to bring to bear upon the practice of their speciality that knowledge which was absolutely essential for the due performance of their duty. The consequence was, that they found now, as in other departments of science and knowledge, dentistry had not been behindhand in making progress. Instead, however, of devoting so much of their attention to the extraction of teeth, they had found, by experience, that the conservation and preservation of the teeth was a far higher aim of their art and science than the former practice of extracting them with so much freedom and without due consideration. The object of the gentlemen who had been instrumental in promoting the development of the Brighton Dental Hospital was two-fold. They knew that all great hospitals, at least a large number in the country, had a two-fold object: the one was to educate and train a body of medical practitioners so that they might render the most valuable help that they possibly could to the community at large. The other object of these institutions—and it was inseparable from that he had mentioned—was to bring to bear on the treatment of the diseases and affections the poor were likely to suffer from, the highest medical skill that could be obtained throughout the country. And those were the two objects for which that Dental Hospital was about to be established. The first to extend the field of observation to the general staff connected with the institution so as to give them larger opportunities of developing a knowledge of their art and profession ; and secondly, it was instituted for the purpose of relieving the poor from one of the most torturing, though perhaps the least dangerous, affections to which human nature was liable—he meant the toothache. Having read some stanzas from a poem by Burns, descriptive of the agonies of toothache, he said it was in a great measure to relieve the sufferings caused by toothache that this institution was to be founded, and that the able staff who had been appointed would succeed in doing this the meeting, he was quite sure, would have not the slightest doubt. They were men who had by education qualified themselves according to the regulations of the Royal College of Surgeons, and they were duly registered as duly qualified dental practitioners, and they might rest satisfied that they would do all that within them lay to relieve the suffering of the poorer classes of the community who might seek relief from the institution. (Applause.) There was another point to which he might make reference. He did not quite know whether the funds of the institution would at present admit of so large an expenditure as to supply substitutes for those teeth that had been extracted or decayed and were lost to the parties which he was certain from his knowledge of the evils to the digestive organs through imperfect teeth, or from the loss of teeth ; if the funds of the institution would enable them to supply those among the poor who had lost their teeth, with new teeth, they would be conferring almost as great an advantage on the poorer classes of the community as they did, they must acknowledge, in simply removing pain, or cleaning, or repairing teeth. To ladies, teeth were regarded as the great element of beauty, and they might depend upon the same sensitiveness on that point existed amongst the poorer classes of the community as amongst those who walked in the higher regions of society. The consciousness of having teeth, whether real or artificial, was an element which contributed largely to the happiness, not only to the higher classes of society, but those who were in a humbler position of life. It would be difficult for him to exaggerate the importance he attached to a good dental hospital, in the centre of a large poor population, and he was happy to think that the managers of the institution had selected a very central site for it. He believed it was "comeatable" for the poorer classes, not only from the east and west of Brighton, but the northern parts of Brighton, and and he also thought the Committee had acted very wisely in naming the institution the Brighton, Hove, and Preston Dental Hospital. (Applause.)

The Hon. Secretary read the following report:—"It is evident that no profession has made such progress during the last few years as dentistry. Dental surgery has risen to a very high position, from which it cannot be disturbed, being a recognised branch of the medical profession, having a special dental law and register, controlled by the Medical Council of Great Britain and Ireland. Dental societies, hospitals, and journals exist in numbers in these islands, America and all parts of the world. Only a few weeks since, a branch of the British Dental Association for the South Eastern Counties was established, and to-day we have met to open a dental hospital for Brighton and district. In introducing such an institution to the public, as Councillor Dr. J. Ewart has so kindly consented to open this day, a few words of explanation are necessary. Firstly, it will be said, will this dental hospital interfere with any other charity in the town? Certainly not. We are all aware that the dispensaries and children's hospitals have official dental appointments, but the work at these institutions, in a dental aspect, is very limited. At the dispensaries only extraction of teeth is performed, and at the children's hospital filling teeth and operations, beyond extractions, is done to a limited extent only. On the staff at this special dental hospital we have the dental surgeons of the Brighton and Hove Dispensary, Throat and Ear Dispensary, Blind Asylum, Homœpathic Dispensary, and Royal Alexandra Hospital for Sick Children. The sup port ofthese gentlemen is given as they feel the need of a special dental hospital. The Brighton, Hove and Preston Hospital is intended for the relief of the suffering poor of all nations. Regulations :—1. The hospital is open daily (Sundays excepted) and patients are admitted between the hours of 8.30 and 10 a.m. 2. Patients suffering from any disease, embraced in the practice of dental surgery, being in pain and requiring urgent relief, are admitted without a recommendation, and receive such operative assistance as may be immediately necessary. All others must be specially recommended by a governor or subscriber. 3. By the rules of the hospital, Life Governors are entitled annually to five letters of recommendation for special operations (for each donation of five guineas in one sum) ; Annual Governors to five (for each half-guinea annually subscribed ; and annual-subscribers of five shillings to two. The work of the hospital is one of a strictly conservative description. We wish to explode that antique idea that exists among the poorer classes that because a tooth has ached it must be extracted. We further desire to show them the usefulness of stopped teeth, the necessity of care and attention by regular and daily brushing as necessary adjuncts to the integrity of the dental organs, which add so materially to long life, inasmuch as, when in good condition and doing their proper share of alimentation, they promote good digestion and secure better general health. Ordinary operations will include extraction of teeth that cannot be preserved and restored to usefulness by filling, and all minor operations ; these need no letters of commendation. Special operations include—treating and filling carious teeth, extraction of useless teeth under nitrous oxide gas, ether, or chloroform, irregularities of teeth, deformities of the jaws, fractures of the maxillæ, artificial plates for the restoration of the hard structure and soft parts, where disease or want of development or accident have caused the lesion—and all other diseases embraced in the practice of dental surgery. It has been asked, will the dental hospital deprive any man who is willing to work for low fees?—To which I reply, are the other local medical charities depriving any medical gentleman who is willing to accept small fees? I say no; and the committee strongly urge upon every subscriber, before issuing a ticket, to be sure that the applicant is a fit subject, as the medical staff have power to refuse the benefits of the institution to any person they consider to be an unfit recipient of them. It has been the custom of many members of the dental profession to see gratuitously persons at certain hours and days, which was another reason for founding the institution, for now patients can be attended to any day in the week, and the hours are extended. The Committee wish to call attention to the building, which, although small, they think will well answer their demands for a short time, till the hospital is well known. Great attention was given to have it situated in a convenient part of the town for those who would be most likely to seek relief within its walls, and I think we have succeeded, as most of the poorer and working classes dwell in the north part of the town. The Committee desire to publicly thank those gentlemen who have so kindly assisted them in establishing the hospital, and they especially wish to thank S. Bevan Fox, Esq., L.D.S., of Exeter (one of the founders of the dental hospital of that city) for the very valuable assistance he has rendered them. The hon. secretary concluded by quoting records of the work done at the London, National, Manchester, Edinburgh, and Exeter Dental Hospitals.

Mr. John Wood said twenty-five years ago it was first suggested that a Dental Hospital should be established in Brighton, but, after several meetings it fell through. Some six or seven years ago it was taken up by a few prominent gentlemen in the town, but it again fell through. Just lately, however, a few more energetic gentlemen determined that something of the kind should be established, and after various meetings a public meeting of the members of the profession was called, and it was unanimously thought it was the right thing to do; but they considered the time most inopportune owing to the distress in the town, and that it would not be right to ask the town for support. But the promoters thought otherwise. They thought the most opportune time was when the poor required assistance, and he was now very gratified, and he was sure all members of the staff and promoters generally were, at this happy result of their meetings. He was sure the readiness with which gentlemen—medical men of the town, and dentists men who had practised for many years—came forward to identify themselves with them, augured well for the future of that institution (applause). It was said at the public meeting by one gentleman that the institution would injure the smaller dentists, but they did not think for one moment it would. The hospital only attended to those people who were unable to pay a small fee. The institution he felt sure, would assist very much in the education of dental students, and in a large town like this, where there were so many dentists, he felt sure that many would adopt dental surgery as a profession.

Mr. O. A. Fox said a pleasing duty fell to his lot, and that was to propose a cordial vote of thanks to Dr. Ewart for his kindness in consenting, at the twelfth hour, to open their Dental Hospital. He was particularly pleased also with the remarks he made. He thought it was a shame that the institution had not been established before, and spoke of the great advantage it would be to students, who would be able to go from them and graduate in London.

Mr. C. B. Stoner, seconded, and the resolution was carried unanimously.

Dr. Ewart, in reply, said the staff and management had conferred upon him a distinguished honour in asking him to undertake such a very important duty. He could only say in the few extempore remarks he made he felt very sincerely. He thought the institution was very much wanted, and felt convinced that, under the able auspices of a good strong Committee and an excellent staff, it would confer untold good upon the poorer classes of the town. (Applause.)

The company then went over to the Hospital, which was declared open by Dr. Ewart, who spoke highly in favour of its cleanliness, accommodation, and adaptability. He said he had seen many buildings opened, but he had never seen one which gave more promise. (Applause.)

The proceedings terminated shortly afterwards.

APPOINTMENT.

Eugene C. Clarke, L.D.S.I., of Bangor, to be Honorary Dental Surgeon to the Normal Training College.

VACANCY.

Western Dispensary, Rochester Row, Westminster, S.W. —Honorary Dentist. Applications by July 19th, to the Secretary.

BIRMINGHAM DENTAL HOSPITAL.

June, 1886.

Number of patients	996
Extractions	756
Completed Fillings	70
Dressings	92
Irregularities	3
Miscellaneous	75
Anæsthetic Cases	29
No. of Operations	1025

W. Palethorpe, House Surgeon.

WORK DONE AT THE VICTORIA DENTAL HOSPITAL, MANCHESTER,

During the Month of June, 1886.

Number of Patients attended		739
Extractions	Adults	
	Under 14	
	Anæsthetics	25
Stoppings.—	Gold	19
	Other Stoppings	62
	Miscellaneous	215
	Total	871

HENRY L. KNOOP, Hon. Secretary.

British Journal of Dental Science.

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SECONDARY EPITHELIOMA SURROUNDING LEFT HALF OF THE BODY OF THE LOWER JAW: REMOVAL OF THE GROWTH, TOGETHER WITH HALF THE JAW; RECOVERY; REMARKS.

Under the care of CHRISTOPHER HEATH. F.R.C.S.,
Holme Professor of Surgery, and Surgeon to University
College Hospital.

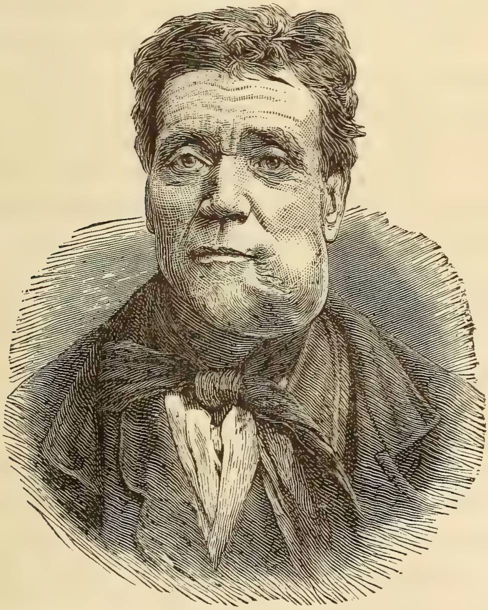
Epitheliomatous growth secondary to that of the lip, seldom permits of successful removal when it has attained the size of the tumour in the present case. It is unusual to find so extensive an involvement of the bone, as in this instance, with such slight glandular affection, the secondary growths generally appearing in the glands under the jaw and involving the bone later and to a much less extent. The illustration shows well the size and appearance of the growth. Not only was the patient successfully relieved of a painful disease by the operation, but, from the careful manner in which all trace was removed, he has a prospect of prolonged life. For the notes of the case we are indebted to Mr. Bilton Pollard, surgical registrar.

J. H——, aged 55, a labourer, was admitted into University College Hospital on March 22nd, 1886. Two years-and-a-half-ago an ulcerated swelling formed in the lower lip, close to the left angle of the mouth. About six months later the growth was removed, and the patient remained well till a year ago, when he noticed a swelling beneath the left angle of the lower jaw. The secondary growth had steadily increased in size up to the time of admission, when the lower part of the left side of the patient's face was much enlarged (see figure). The swelling extended from the middle line beneath the chin to the angle of the jaw, involving all the tissues in the left sub-maxillary space, and almost surrounding the body of the jaw.

On March 24th, the patient being under the influence of chloroform administered through the nose, Mr. Heath entered the scapel about half an inch below the left angle of the mouth, and carried it downwards and outwards over the growth in an eliptical manner for three inches and a half. A similar incision was made between the same points, but at a distance of an inch and three quarters about the middle. The healthy skin was then dissected up till the limits of the growth were reached; the knife was then sunk down to the jaw in the middle line and through the masseter muscle to the ramus of the jaw, and the bone was sawn across at those two points. The bleeding from the inferior dental artery was arrested by touching it with the point of Paquelin's cautery. The tumour was then drawn outwards and the mass freed by dividing the muscles attached to the left side of the body and angle of the jaw. After the bleeding had been arrested the edges of the wound were drawn together by three button sutures and accurately adjusted with fine wire sutures. The outer part of the wound was left open for drainage. The wound was dusted over with iodoform, and a dressing of iodoform wool was applied.

The parts removed consisted of the left half of the body of the jaw together with the angle and a small portion of the ramus. It was surrounded below and on both surfaces, except close to the symphysis, by a mass of new growth, which involved the fibres of insertion of the masseter and internal pterygoid muscles, the deep fibres of the mylo-hyoid muscle and the small muscles on the outer surface of the jaw, together with the greater part of the skin included between the incisions. The sub-maxillary gland was removed entire with the mass, and the anterior portion of it was implicated in the growth. The body of the lower jaw was diseased by extension of the growth into it. The growth consisted of a squamous-celled epithelioma; the tissue between the epithelial masses consisted of delicate fibrous tissue and small round cells.

The patient was fed twice a day by means of a tube passed into the stomach; each meal consisted of two raw eggs, half a pint of strong beef tea, half a pint of milk, and an ounce of brandy. On the fourteenth day after the operation feeding by the tube was discontinued, and the patient fed himself in the ordinary way. The dressing was changed twice a day. On the twelfth day after the operation all the stitches were removed; the wound had healed by first intention, except at the posterior part, which had been left open for drainage. The patient was discharged on the twenty-second day after the operation; he was perfectly well and free from pain; there was a small sinus at the posterior part of the scar, and through it a little saliva dribbled.



Remarks.—From the above account and from the woodcut it will be seen that the growth was very large, and that its extirpation involved a great loss of skin and the removal of all the tissues in the left submaxillary space. The wound, nevertheless, healed rapidly and well—a result which may be largely attributed to the care which was taken to keep the wound and the mouth thoroughly clean. With this object in view, the patient's food was poured directly into the stomach for fourteen days after the operation, and the wound in the mouth was dusted twice a day with iodoform. The tumour itself presented some points of interest. The patient had had a growth removed from the lower lip two years before, so that it seemed most likely that the tumour under consideration was epitheliomatous, and that it was secondary to that primary growth. The tumour, however, presented the characters of an independant growth in connection with the body of the lower jaw, for it almost completely surrounded that bone and consisted apparantly of a single solid mass. There were no outlying enlarged lymphatic glands, and the growth was situated at an higher level than is usually the case with growths in the lymphatic glands secondary to epithelioma of the lip. That it was an epithelioma was shown by the microscopical examination, and so considering the healthy state of the scar resulting from the operation on the lip, the tumour must have originated from a secondary deposit in one of the lymphatic glands beneath the jaw, and have spread widely from that centre without infecting other lymphatic glands of the jaw. On the external surface of the latter it spread upwards as far as the alveolar border and over the ramus to the level of the lobule of the ear. A large mass of new growth projected into the floor of the mouth opposite the posterior part of the body of the jaw. At the left angle of the mouth there was a scar which reached down to the growth; but the scar itself was free from new growth. Over the most prominent part of the tumour the skin had a purplish colour and was fixed to the growth beneath, by which it was clearly implicated. The tumour formed a single mass, and no outlying glands could be felt.

CARIES OF THE TEETH.*

By George S. Allan, M.D.

The subject selected is one of the most worn of any that pertains to our specialty, and I am well aware that you are almost weary of the word "caries." We must continue to study the subject, however, even if we love it not, for justice to our patients demands that we keep fully abreast of the times in all that will add to our skill or aid us in practice, and it is equally our duty to freely give one another any thoughts or principles that we may have found useful.

On this latter idea I make my plea with you this evening, and have thought that in placing before you a few of the principles that have guided me in my daily work I might interest you, even if I fail to add to your knowledge.

When a boy at school I was told that "the higher I aimed the higher my arrow would go," and later in life the same thought was conveyed by the phrase, "Look well to ideals and results will take care of themselves."

He who has but a crude idea of what a perfect tooth in a healthy mouth is cannot be expected to bring his operations up to the highest standard. Of course, we can only approximate the perfect standard, but we can do our best, and the first step is to have a clear conception of what the finished model looks like. We will then be in the best position to detect any variations in or deviations from the same, and to take the shortest path to our goal. What has all this to do with "caries?" Let us see. Have any of you ever seen a perfect tooth in a perfectly healthy mouth? I assure you it is a very difficult thing to find, and we can never be sure that we have succeeded, as an examination with the microscope would necessarily be the final test.

We all know how fair and beautiful some teeth look for years, and then, when some change of environment comes, how the weak spots manifest themselves and the tooth crumbles away, leaving us to wonder why we did not detect

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*Read before the New York Odontological Society and reported in the *Dental Cosmos*.

the point or points of danger sooner. A healthy mouth, so far as the gums, mucous membrane, secretions, etc., are concerned, is far more common than an ideally perfect tooth, I have tried my best to find a secretion of such a tooth, but have yet to obtain it.

When I was in Cuba a month or two since I was obliged to wait some time at a station, and amused myself examining the teeth of quite a number of boys who were idling in the vicinity and asking people for money. They were boys of the poorer class, from twelve to sixteen years of age, and all colours, from black to almost white. Their teeth, although showing no evidence of the slightest care or attention, were in almost perfect condition, and it was certainly one of the most marvellous exhibitions from a dentist's stand-point that I have ever seen.

I now ask your attention to consider briefly what the so-called caries of the teeth is.

The one and only point that we can hold to without at once arousing opposition is that caries always begins on the outside of the tooth, and cannot by any possibility commence within the structure. This much we *all* accept. Another point we are almost agreed upon, but not quite, viz., that caries is the disintegration or breaking down of the tooth-substance by the solvent action of acids on the lime-salts of which it is mostly composed. That this acid theory is not universally accepted we have evidence enough at hand. A considerable number still believe that caries of the teeth is a disease having a constitutional origin, and therefore amenable to constitutional treatment. Once outside of these two accepted facts, and we find ourselves on a sea of troubled waters. Opinions differ, questions multiply, and argument becomes more bitter and pointed as the evidence reaches the domain of doubt and uncertainty.

The two theories that have the most prominence and weight I will briefly call your attention to, for each in turn has a direct bearing on the subject we are considering. The first is the bacteria theory, which aims to account in a large measure for the acids that are the immediate cause of caries of the teeth. The bacteria theory is not a modern one, but this present age has seen it for the first time placed on a scientific basis, with its problematical and speculative character removed. No one can read carefully the monograph of Dr. W. D. Miller, of Berlin "Fermentation in the Human Mouth: Its Relation to Caries of the teeth," without being impressed with the great patience, care, and technical skill with which he has worked out his conclusions and made complete the chain of evidence. The profession owes much to Dr. Miller for having placed this theory on a solid basis. Without going into details let us see what has been proved.

1st. That fungi—bacteria—constantly exist in the mouth, and especially in and around carious teeth, and as a resultant of their growth and increase a ferment acid—lactic—is produced.

2nd. That these fungi can be isolated, their specific character determined, and their life-history studied.

3rd. That artificial caries can be produced by placing teeth in a "pure cultus" of these fungi, which cannot be distinguished microscopically from natural caries.

4th. That this "organised ferment"—fungi—grows and reproduces itself, though excluded from air and oxygen, the other conditions being favourable; and therefore a water and air-tight filling alone is not at all times an absolutely sure preventive of caries.

The chemico-vital theory which lays great stress on the resisting force of the vital powers of the tooth, is also an old one. The great resisting force of living tooth-substance to the active agents producing caries is almost universally acknowledged. How this force acts is quite another question.

Much has been said in our societies and magazines lately on the so-called "bioplasson doctrine," a doctrine which claims that the life-giving and developing powers of protoplasm are located in a fibrous network or reticulum within the mass. Not satisfied with this, it extends the reticulum into Beale's so-called "formed material" and obliterates all former ideas about protoplasm. Had the believers in this new doctrine confined the reticulum to the protoplasmic corpuscle as we see it in the white blood corpuscle or the pus-corpuscle, it would not have attracted great attention, and many would have given it credence, but the doctrine as it is has been criticised sharply. Outside of our profession it has been noticed but little, and that little has been far from favourable. At this time I do not care to take up the question on its merits, and I allude to it now for but two reasons: First, because it makes the enamel a living tissue,—a statement which I believe to be utterly fallacious; second, I am unwilling to have all dentists go on record as accepting it. Nor would I have the Odontological Society endorse it unanimously.

Dr. Bödecker's statement that there is a stellate protoplasmic reticulum in the inter-prismatic substance of the enamel deserves a passing notice. Dr. Bödecker claims to have demonstrated his position, and states that he has specimens (his own handiwork), the evidence of which cannot be questioned. Said specimens I have not seen, nor do I know of any careful, educated histologist who has had that privilege, other than those who work with the doctor. I do know that many painstaking and skilled workers have repeated Dr. Bödecker's process with results not at all satisfactory. Negative evidence this, I admit, but far from worthless when we consider the character and fitness of the men who undertook the work. To outsiders the theory seems most improbable and lacking in proof. A study of the developing tooth affords at best but negative evidence, and a morphological or chemical examination most positively opposes it. The histological evidence seems inconclusive, with the chances all in favour of time proving that errors in technique and interpretation have misled the searchers after truth.

I now wish to call your attention to several peculiarities in the different dental tissues, and to suggest a few practical points or methods of practice which may be adopted because of them.

All evidence proves that enamel is a crystalline substance and not homogeneous, the prisms and the cement-substance between the prisms being of unequal density and brittleness, so that it is very difficult to cut it and leave a smooth even margin. If it were homogeneous, even though of the most brittle character, it would be easier to cut that line smooth than it is under existing conditions. Take your instrument and cut through materials of different degrees of hardness, and you find that the difficulty in getting a smooth margin is very great. I find that the best way to cut these enamel margins is with a sharp bur revolving at a high rate of speed. This I have proved to my own satisfaction by preparing cavities in teeth out of the mouth and examining them under a magnifying glass. I found that with my hand-instrument it was almost impossible to get the margins perfect.

I am of the opinion that practitioners have not paid sufficient attention to the fact that the union of the enamel and dentine is a mechanical rather than a vital one. The study of tooth-development proves that the union of these two structures must necessarily be mechanical, as they are separately formed and originate from cells of entirely different character. In cutting specimens the knife is very apt to separate the two, the fracture always being at the line of union ; for neither the enamel nor dentine breaks readily in its substance. The mechanical union referred to is, however, a dual one, for, besides the "dovetail" formed by the junction of the roughened surface of enamel and dentine and a slight interchange of fibers, they are cemented by a material very like the interprismatic substance of enamel.

My observation and experience have proved to my satisfaction that enamel will separate from dead dentine more easily than from living dentine.

Another point that I wish to draw your attention to is that in excavating great care should be taken not to cut off the dentinal tubules nearer the pulp than is absolutely necessary. All the retaining points or grooves should be formed as near the line of the enamel as possible, for if the dentinal tubules are cut near the pulp the zone of dentine surrounding the filling will be a zone of dead dentine, and much more liable to decay than if it were living. Among the specimens to be shown you this evening is an interesting one from Dr.

Atkinson's collection, which will illustrate this point, as the undercuts of the cavity shown were made very deep therein, cutting off all connection between the pulp and much of the dentine surrounding the filling,—one effect of which is shown in the different colour of the isolated portion. The dentinal fibrils once cut off from the pulp, *die*, then decompose and become a source of danger, for dentine filled with putrescent matter must certainly be more liable to decay than if naturally nourished.

The age of the patient has much to do with this, the danger being greatest in very young teeth, and almost *nil* in those of old age, where the tubules are for the greater part filled with a secondary deposit. Caries in enamel and dentine operates, as a rule, in opposite ways. In the first breaking down of the enamel an acid acts upon the substance between the prisms, as can be readily proved by taking the débris that is in an old cavity, mixing it with a weak solution of glycerine and alcohol, and placing it under the microscope. You will find enamel prisms, but no interprismatic-substance. The enamel is not broken down in an amorphous condition until long after the prisms have been separated from each other; whereas caries of the dentine almost always, where an acid has penetrated the tubuli, commences its ravages from the interior of the tubules and works outwards; the first caliber of the tubuli is enlarged, and then one or more coalesce.

If we were asked what kind of a cavity we could fill with the most certainty, so that there would be no decay afterwards, I think we would all say, "Let me make the cavity in perfectly healthy tooth-substance." No matter how small a cavity of decay may be, the zone of affected tooth-substance will extend far beyond our excavation. We never, as a rule, cut down into substance that has not been somewhat affected by the inroads of acids. It is for that reason that I have always advocated filling the smallest possible cavities. As soon as there is a break that we can detect with our instrument, we may be sure there is a zone of affected tooth-substance extending away beyond that point. I have an interesting specimen showing Magitot's zone of affected dentine surrounding the beginning of caries in the pit of a molar. Magitot claims that the tubuli are filled with a sort of secondary dentine that becomes solidified thereby closing them. If Magitot is right, then Dr. Miller in his theory of bacteria is wrong, for if these tubuli become closed by the action of advancing caries they could not be filled with bacteria, nor could they become enlarged by the action of such contents. I do not know of any histologists other than Magitot who cling to that theory, and I have yet to examine any specimen where I could clearly demonstrate that these terminal points of the tubules have been solidified.

In my further reference to the treatment of caries, allow me now to call your attention to the neck of the tooth where the enamel stops, and to emphatically assert that, in my opinion, it is a point of great danger, for several reasons, and deserving of the most careful and thoughtful treatment. Normally the cementum slightly overlaps the enamel, but this portion of the tooth is not constant in character.

Often the two structures do not quite join, and a little ring of dentine is left exposed as a consequence. This condition causes the tooth to be rough and uneven, a groove resulting from the failure of enamel and cementum to join, while the normal tooth is smooth at this point, the junction of the two structures making a continuous and straight line. It is really astonishing to find so large a percentage of mouths containing teeth suffering from this cause, and its disadvantages are many. As you well know, the gum does not adhere to the tooth until you get to the line of the cementum. It is entirely a union between the cementum and the gum, and *never* between the gum and enamel. It is very difficult to keep the teeth clean when in this condition, and the inequalities mentioned invite deposits of tartar, welcome decay, and irritate the margins of the gums, which show a tendency to recede, as they always do when greeted by a rough surface. I would lay great stress on this marginal appearance, on account of its being the common seat of caries between the teeth, and also because where you have a recession of the gums it is often caused by this uneven, rough character of he neck of the tooth. Since my attention was first attracted to it, I have made it almost a daily task to take a fine, sharp instrument and press it up under the gum, to see if I could find a perfect margin, and it is very seldom that I do. Where there is a slight recession of the gums, I find that by polishing off this margin, and so far as possible producing a continuous even surface, the recession can be arrested. I do not use a powder there, for I think it is unneccessary. A fine, rounded-edged excavator will make that margin more perfect than it can be made by any other means that I know of ; and I am quite certain that where that is used carefully and thoroughly the recession of the gums that comes from the irritating effect referred to can be arrested if not entirely stopped.

It has been suggested that this rough condition of the neck of the tooth is caused by the action of corrosive agents ; but I feel sure that such margins would not result from the agents suggested, and my study of the subject causes me to believe that said condition is a defect present when the teeth are erupted. Therefore, while the *ideal* tooth, as regards its ability to ward off deteriorating influences, would present a smooth and almost straight line at this point, I must admit that the *normal* tooth is apt to be far removed from our *ideal*.

The specimens shown this evening were prepared in the usual way by being immersed in a weak solution of chronic acid, cut with a microtome and mounted in benzole balsam. These are not exaggerated cases, but were taken at random, and do not illustrate the imperfections referred to as well as though specimens had been selected with more care and trouble.

And now, in closing, I would like to make a suggestion in regard to the selection of filling materials, and beg that you will give the question the benefit of your consideration. In selecting the filling for any cavity, eliminate the *cavity* from your problem. Imagine that it is already cared for with an ideal filling ; one that neither contracts nor expands ; that is not acted upon by any of the fluids of the mouth or the forces of mastication, and one that you can place in the cavity without breaking or chipping its edges. Now ask yourself how long it will be, with such a filling in position—taking into consideration the environments and conditions as they exist, or are likely to exist, and the probable good care or neglect of the tooth by the patient—before caries attacks the tooth ? The answer to this question will determine the sort of filling to be used. It would be folly to fill a cavity with a material that would last twenty years, if the walls of the tooth are certain, because of their frail condition, to break away in a few months, unless the more durable filling can be inserted with as little danger to the frail edges and with the probability of increasing the chances of longevity. Even then you will take into consideration the facility with which, if necessary, any certain filling could be removed. I thank you, gentlemen, for your kind attention.

ON THE LIMITS OF USEFULNESS IN DENTAL OPERATIONS AND THE PRESERVATION OF UNFIT TEETH.*

By Alton Howard Thompson, D.D.S., Topeko, Kansas.

The impetuosity which has characterized the growth and progress of dental science and art of late years present some features which, to the conservative and cautious mind, make that progress not altogether satisfactory. These features suggest grave doubts as to the really practical benefits to be conferred by some high-class operations which we perform now-a-days, and as to their durability and permanence if serviceable.

We are proud, and justly so, we think, of the wonderful discoveries of our leading experimenters and inventors, whose productions the mass of the profession are quick to adopt and apt in learning to apply in practice ; and we have become so accustomed to performing wonderful things every day in the preservation of diseased teeth and the reproduction of lost

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*Read before the Kansas City Dental Society, and reported in *Dental Cosmos.*

dental tissues, that we scarcely stop to consider how wonderful our creations really are, but think only of reaching forward to the accomplishment of still greater things. This is a laudable ambition, for it is the earnest of yet greater things to come. We discuss our triumphs with a complacency born of our satisfaction with our marvellous success in the preservation of everything in the way of teeth, or fragments of teeth, whose lost parts may be restored in gold or porcelain, or upon which artificial substitutes may be erected. Of recent years our artistic attainments have reached a height undreamed of in the student days of most of the dentists in practice to-day. This is especially true in the new field of crown and bridge work.

But to the cautious and conservative mind there will often come the disagreeable thought, like a misgiving, that the progress of the day in dentistry is too much towards high art, regardless of physiological requirements. The ambition is to produce artistic dental jewelry, without scientific consideration of the anatomical limits of endurance, or the possibilities of duration in the vicarious performance of the physiological duties of the teeth, and of the pathological dangers involved. Regarding the underlying scientific principles, there is a reckless ignoring of these considerations which cannot but be disastrous to the parts and the structures. There is a too lavish expenditure of time, strength, and expense by both patient and operator for the service rendered. The patient is not compensated and the operator is not honoured by a structure which but indifferently and briefly performs the work of the lost parts which it replaces.

As an extreme example, the writer recalls a very artistic production which consisted of the entire upper denture made in one continuous piece of bridge-work, supported upon three anterior teeth. As a piece of dental jewelry it was magnificent and unapproachable by the ordinary dentist : but as a piece of prosthesis it promised only failure, and of course led soon to the loss of the supporting teeth. That piece was inserted in reckless disregard of the anatomical limits by which bridge-work is hedged, and of its ability of performing efficient service as a substitute for the lost teeth.

This is an extreme example, of course, but too much of the bridge-work of the day is of the same reckless, unscientific kind, differing only in degree. There is too much mechanism and not enough science about it. The worship of art leads to overtaxing nature. The teeth and roots are asked (perhaps expected, if the operator thinks about it at all) to support more than nature ever intended that they should,—more than they or their environments were constructed to support, either anatomically or physiologically,—and must in a brief time succumb to the unusual strain. A tooth or root is designed to support one crown and no more. Nature will not long endure multiplied burdens. In rare cases, perhaps, one or two teeth can be supported with safety between and by two very strong teeth or roots, but even that load is assuredly overtaxing those teeth, and nature will revenge the transgression in time. And then regard should always be had to the organization of the teeth before a piece of bridge-work is inserted, and none but the strongest should be asked to endure it. The majority of the people who are obliged to seek the services of the dentist possess teeth which are too weak to bear more than their own share of the work, and are scarcely strong enough for that.

We must bear in mind that the teeth of civilised man, as well as their supporting environments. are much weaker than those of the savage. The teeth in the higher races are being gradually reduced in accordance with the workings of evolution, and are therefore more or less rudimentary and immature. And thus, while scarcely able to do the work required of them, it is rank folly to overtax them with burdens which we could with safety put upon the savage or the ape, because they possess much superflous strength. By asking it of such teeth we only cause their premature exfoliation, and anticipate that edentulous condition which is the accompaniment of old age, or perhaps of the coming man.

To the expectations of usefulness of crown and bridge-work there are limitations which cannot be ignored. Recent writers are beginning to recognize these limits, and speak less confidently of the unlimited extent to which the work may be applied. One directs that the supplied teeth should be free from occlusion, and another that, as the supporting teeth will elongate in time, allowance must be made for this in the bridge teeth supplied. Again, we are told that a piece should be removable to treat the supporting teeth, which are liable to abscess. These are fatal admissions. They point plainly to the results that the cautious scientific mind anticipated and saw must ensue when the work was first proposed—i.e., that the irritation produced by the excessive strain upon the supporting teeth would inevitably lead to exfoliation or abscess sooner or later.

Another important matter which has not received the consideration which it deserves, is that the loss of the natural interstitial motion of the teeth for a time must also be a source of periosteal irritation, until the ultimate failure of the piece. We say *for a time*, because two teeth cannot be bound so firmly together by any known device as to entirely prevent movement in the sockets ; but will soon regain their freedom, and at the cost of the loosening and failure of the piece. All mechanical structures should be constructed on philosophical principles, and in the construction of bridge-work no principle is so important as the interstitial motion of the teeth.

The teeth have various motions : (1) interstitially,—i.e., from tooth to tooth ; (2) between outside and inside ; (3) partial rotation in the sockets ; and (4) perpendicularly in the socket. These motions are caused principally by use in mastication, and are imperceptible to either sight or feeling. They are also caused by the motions of the tongue, cheeks, and lips in speech, and by a movement under tension of the circulation. In view of these facts it is remarkable that bridge-work dentures have not been constructed with a view of accommodating these motions. As no two teeth can move in unison, they should not be bound like slaves together. Allowance should be made for rotation, and for lateral and perpendicular motions. If this were done the pieces would be more durable as regards their attachment to the supporting teeth.

The hinge, the tube and rod, the swivel, the incased teeth and telescoping crowns, and other mechanical accessories, should be employed to provide for this motion, for without such contrivances the motion will cause the cement to loosen from its attachment and the piece will give way. But the ignorance displayed in this respect is only one of the phases of the utter disregard of scientific laws and limits to which the bridge-work artist is addicted, and is more or less characteristic of the crase.

Then there is the hygienic side of the question, in view of the doubtful cleanliness of bridge-work when in use. Its advocates claim that it can be kept clean and wholesome, but as no artificial denture can be well cleansed unless it can be removed it is to be doubted if this is true. Perhaps a strong antiseptic wash frequently used would prevent fermentation, but mere rinsing cannot remove the débris. At any rate, patients *do not* keep them clean, either because they will not or cannot, and the retention of débris is a very serious objection.

It is to be feared that, when many of these magnificent productions begin to give way and good teeth are lost because of them, there will be a reaction which will go to the other extreme, and create a distrust of the work which will lead to its wholesale abandonment. That would be most unfortunate, for the work has its uses in places where it can be advantageously employed. It would be better to call a halt and put the brake on our impetuous progress in this direction in time. It would be better to consider well what we attempt to do,—not to overtax nature, and be sure that we do not exceed the limits of usefulness in order to merely produce highly artistic results. This caution will preserve to us a useful class of work for a limited number of cases; but the abuse of it and its unlimited application will lead to failures. And these will create an unmerited prejudice against and abandonment of it.

But in other departments, also, there is danger that we may exceed the limits of usefulness. In the field of the medical and surgical treatment of the teeth and their surroundings we may overreach the requirements of service in preserving teeth which are unfit, and which merit only extraction. Our success in the treatment of diseased teeth has been phenomenal in the history of surgery, and is second only to our artistic productions. But there is little doubt, for instance, that we preserve too many ulcerated teeth, especially in locations where they are of little or no service to the patient. A second or third molar without an antagonist, which is in a chronic state of ulceration, the cure of which involves a tedious course of treatment with a doubtful result, had better be extracted. There is always a doubt as to a chronic ulceration being permanently cured ; especially as with unfavourable organisation. There is a strong probability that the parts will remain in a dormant irritable condition, a nucleus for neuralgia, and possibly for final and severe abscess.

We do not discriminate rigidly regarding the preservation of such teeth, but press the practice of retaining everything in the shape of teeth to injudicious extremes. We are bound to admit that the strictures of Dr. Sexton and others were not without justice,—accompanied, as they were, by a great deal of injustice. Many dead teeth have been put in such a healthy condition as to remain as free from irritation as any live tooth in the same denture, and thousands of such are doing faithful service to-day. But we cannot deny that there are other thousands that are dormant volcanoes ready to break out upon cause, or which are the potent source of neuralgias or of reflex opthalmatic or aural diseases. It is such as the latter that we should endeavour to select from the class of dead and ulcerated teeth as fit only for removal, and whose retention would be a positive harm to the possessor. We need to exercise an exact scientific discrimination between the diseased teeth which should and those which should not be preserved,—taking into full consideration all the bearings of the tooth with regard to its usefulness as a masticating organ, the presence or absence of an antagonist, the health of the environments, the condition of the crown, its value as regards speech and appearance, and, lastly, the organization of the patient with reference to the general health, temperament, and recuperative powers, both present and prospective. The measure of a tooth's usefulness should always be taken before any operation is performed upon it, and especially when dead and diseased.

It cannot be denied that we have swung too far in the direction of the indiscriminate preservation of teeth. We have become unreasonably prejudiced against the extraction of teeth, and have come to regard it almost as a crime, as of the wanton amputation of a limb. But limbs must be amputated sometimes to save life, and teeth must sometimes be extracted for the benefit of the patient. We loose sight of this truth too often, and endeavour to preserve teeth without sufficient regard for the welfare of the parts or the usefulness of the tooth. In this, as in all matters pertaining to our specialty requiring careful discrimination, an educated scientific judgment should be brought to bear, that the best results may be attained.

Not only in the class of dead and ulcerated teeth should extraction be more frequently resorted to, but also in the cases of carious teeth requiring merely filling. A carious tooth in a crowded arch should often be removed in preference to filling, that the remaining teeth may become spaced and thereby have a better chance of escaping caries. The upper bicuspids or the first molars in either jaw often present conditions which, taken in conjunction with the crowded or even only closely set position of the teeth, would indicate that their removal would be better for all parts concerned than their preservation by filling. If soft teeth are closely opposed, caries is certain to ensue in the bicuspids, and one or more of them, or the first molars, will as certainly be lost. With that probability staring us in the face, would it not be better to extract the carious tooth at once, that the remaining ones may have a chance? All those who have been in practice ten years or more have cases in which they now perceive that it would have been better for the denture to have removed such teeth, and now regret not having done so in time; and they will also have cases in which they have removed bicuspids or first molars for crowding, and in few of these will they see cause for regret. Does not this experience of every one bear its lesson?

A recent writer remarks upon what we all have noticed,—*i.e.*, that all the teeth of a denture are not of the same quality, and that a pair—most often bicuspids or first molars, and more rarely the second molars—will succumb early, and that they should often be removed. Another also makes the correct statement that it is as much "the business of the dentist to extract teeth that ought to come out as it is to save teeth that ought to be saved;" and he takes every opportudity to denounce the obsolete sentiment that "it is the business of dentistry to save teeth."

As the wisdom-teeth are always less dense in structure than the other teeth in the same denture, the desirability of preserving them in dentures which are at all crowded must always be doubted; and as they, more frequently than any other teeth, give rise to reflex irritation, their removal is often preferable to filling when much effected by caries, and especially when the pulps are dead,—unless other conditions demand their retention for service. When the other molars are lost, and they are required for mastication, of course every reasonable effort should be made for their preservation.

Perhaps in the field of prosthesis we often overreach the limit of usefulness and insert dentures when they are not required. An article upon hygiene appeared in a popular scientific journal some time since in which it was stated that the dentist of to-day was becoming too skilful,—especially in view of the fact that he replaced lost teeth in the mouths of old people so perfectly that they were taught to masticate food which was too solid for their enfeebled stomachs to digest,—the point being that, as the stomach and digestion weakened and failed with age with the rest of the economy, there should be a return to the simple diet of childhood or infancy, or one which would require as little effort to assimilate as possible. This the dentist counteracts by his skilful work. The indictment is a curious one, at least, and is perhaps worth consideration. Perhaps, also, in other classes of cases we insert artificial pieces which are superfluous if not injurious.

In other fields we should always bear in mind the possibilities of usefulness and effective service of our operations, and not let our skill overreach our obligations to the patient, which is to serve him well.

But we are not alone in allowing our pride of skill to exceed the limits of usefulness. The oculist who preserves unfit and injurious eyes, the surgeon who preserves unfit limbs,—perhaps the physician who preserves unfit lives,—are exceeding their duty to their patients and to their race.

Indeed, charity and science are exceeding themselves in our day in preserving the unfit to propagate disease and infirmity. The workings of that most excellent natural law of "the survival of the fittest in the struggle for existence" is set at naught by civilisation, which is overreaching itself. It needs to be diluted with a little wholesome barbarism in this matter of the preservation of the unfit to contaminate the entire race. Charity and science are together going too far in the retention of that which is diseased, which had better often be sacrificed for the benefit of that which remains.

POCKET DISEASE OF THE ALVEOLUS.

By J. N. Farrar, M.D., D.D.S., New York City.

As injurious as the malady termed alveolar abscess may be to the usefulness of teeth, there is a disease of the socket known as "Pyorrhea Alveolaris," which in its consequences is more detrimental.

A disease belonging to middle and later life, it attacks at all ages after childhood. Although seldom found as early as at ten years of age, it is not infrequent at twenty, very common at forty, and (in some countries) almost universal at sixty.

The chief characteristic of this lesion, which in its unchecked course passes from bad to worse through several successive stages, is separation of the lining membrane of the socket (scientifically denominated pericementum) from portions of the root of the tooth, thus causing a pouch or pocket between the two, with a mouth at the margin of the gum.

Deferring for the present the aspect of constitutional tendencies this pocket appears to the naked eye to have its initiation in inflammation of the annular lip, known as the "gingival margin" of the gum, which in its normal condition generally constitutes a shallow trough around the neck of a tooth. From whatever this inflammation arises, the ring-like lip swells, causing more or less pouching, so that irritating matter of different sorts easily collects in the trough, which increasingly aggravates the trouble.

Often, if not generally in these cases, more or less pus discharges at the necks of the teeth. In some cases this pus is creamy in appearance, in others watery, and in quantity it varies from that which is invisible to a drop or two. As a rule, a visible quantity of creamy pus indicates the presence of large quantities of soft, degenerated deposits in the pocket, or rough, sharp incrustations of earthy matter upon the root, while a watery discharge is an evidence that the deposit is scanty in quantity, or comparatively smooth. Cases belonging to the latter class are generally more or less chronic.

After this disease has become passive it requires but slight irritation to keep it along. In fact, nothing more seems necessary than the alteration of the juices that ooze from the blood through the walls into the pocket, which soon becomes rancid, and made worse by microbes, which are generally, if not always, present. These are the cases which are sometimes cited as a proof that this disease may arise independently of local irritations. But upon this point more is intended at another time.

While entire sockets are occasionally affected, most of them are attacked only on one or two sides, ranging from a slight distance from within the annular lip to the entire length of the root.

In external appearance this pyorrhea (pus flow) resembles that which I denominated in a course of lectures delivered at Philadelphia in 1878, a whitlowic condition of alveolar abscess; a condition where the pus from the sac, instead of finding vent by the usual route, through the wall of the socket, travels along between its lining membrane and the root and makes its exit at the neck of the tooth. But the two diseases differ widely in cause and effect, as well as in location of their incipient stages.

Differentially speaking, one of these diseases kindles comparatively sudden, and is generally violent in development; the other is slow and insidious. One begins in the interior of the jaw, around about the end of the root, in the form of a tumour, and generally results in an abscess; the other starts on the exterior, just within the gingival margin of the gum, and by a sort of ulcerative process works down between the lining membrane of the socket and the root. (Never beginning about the end of the root, nor is the cause the same in kind as that which leads to exostosis or enlargement of the root.) One seems to make an effort to rid the part of an evil irritant by delivering it from within outwardly generally through the side of the socket, as if attempting to do as little harm to the tooth as possible; the other from without inwardly, as if bent on doing all the mischief possible, first to the socket by the "wasting process," second by the loosening and final ejection of the tooth, soon after which the disease generally vanishes. In short, one seems to act on the defensive, the other on the offensive.

Those rare cases of so-called alveolar abscesses which are said to form on the side of the roots of teeth having living pulps, where there are no pockets opening at the cervical margins of the gums, are not of this variety of socket disease. There are, however, two conditions of abscess that are the result of detached sharp fragments of calcareous deposits from the roots caused by this disease, or in later stages of the pocket disease, after having effected a carious condition of the alveolar process, which, although bodily not ead tissue, yet from decomposition of minute particles here and there, or from stasis in the soft tissues in the rear of the walls of the pocket, but as these must be considered more in the light of "sequels" they do not strictly belong to the present aspect of the question, hence will not be further dwelt upon at this time.

In order to prepare your mind, I will anticipate some features of my story by briefly stating that it has been taught, and the notion appears to be generally believed, that there is always necrosis of some portion of the alveolar process in these cases, and that without it a true type of the disease does not exist, and based upon this, excision of the hard tissue has become almost a universal treatment.

Although sometimes present in later stages of the disease, I am led to believe, from careful investigation and treatment upon an average of about fifty teeth per day for several years, that this disease must really exist long before the alveolus can possibly become carious, a condition which, in some form, must precede necrosis. Furthermore, I think although more frequently present among that portion of the lower orders of society which do not get their teeth extracted whenever slightly annoying, caries and necrosis exist only in a small percentage of cases. Especially so about the middle and upper classes, who are more in the habit of caring for their teeth.

At this time this statement may seem like heresy, but it is based upon careful records of every case in my practice for ten years, which show that only about one per cent of the patients (not the number of teeth) was afflicted with necrosis of the alveolus, the proof of which laid in the cure without surgically interfering with the alveolar process. The same evidence exists in the *almost* universally rapid cure after extraction, which would not be so if necrotic tissues remained.

Although my own practice shows only one per cent., I do not pretend that the experience of others must be the same; but supposing that others should find double the percentage, it would not materially change the basis of the conclusions. Although necrosis of the alveolar process is rare, the death and degeneracy of that portion of the cementum constituting one of the walls of the pockets is not uncommon.

While this disease is as old as civilisation, it received little attention from the profession until a few years ago, and until of late was supposed to be incurable except by extraction of the tooth ; but it is now known to be otherwise, notwithstanding it is pretended that all treatment is as yet empirical, on the ground that the disease is not fully understood.

In such a state of things, as with all questions in dispute, various hypothes and notions abound, some of which seem reasonable, others amusingly absurd, making it appear that all are groping in the shades of uncertainty.

Even the matter of a name for the disease is unsettled. While some people say that one name is as proper as another, and think that Tom Jones is a name for his characteristics, others think that in order to be as scientific and practicable as possible the characteristics of a disease should in a measure be expressed in the derivatives of the same. The term Pyorrhea (pus flowing), although satisfactory to some people, with others is not ; and although I am averse to innovations in nomenclature once accepted by any considerable number of people, I must say that with the dissatisfied I incline, for several reasons. 1st, the lesion does not always flow pus ; 2nd, it fails to express any idea of the chief and constant characteristic of the lesion (pocket), and 3rd, it fails to carry in its meaning sufficient diagnostic value to differentiate the disease from the other pus-flowing socket (whitlowic alveolar abscess), which also discharges at the neck of the tooth.

If what has been said be true, that the disease, so far as can be seen by the naked eye, commences about the neck of the tooth, and extends down the socket-causing pockets, and if true that pus is caused by irritation from deposits within, and the disease vanishes when the pockets are carefully and thoroughly cleaned, and *kept clean*, or when the teeth are extracted, and the main conditions of the lesion differ from that of a whitlowic condition of alveolar caries or necrosis, if present at all, belongs to later stages of the disease, and is a result rather than a cause, then the suggestion naturally presents itself: Ought not the general name to be fixed upon the most pronounced constant feature?

Supposing it were possible to find a term that would by some modification differentiate the two kinds of "pus flowing" would it be best to confine the meaning to simply the act of flowing pus, when it is well known that the act in a large percentage of cases is not visible? Admitting this, for sake of the argument, would it be much better to confine its meaning to any one of the stages, which, if present at all, would, by its transitional acts, soon lose identity? Even if comparatively stationary, would it be well to fix upon stage conditions, such as when the surfaces of the walls of the pocket have become pyogenic, or when the alveolar process has become carious, or perhaps necrotic, when we know that any one, or all, may possibly be wanting? On the other hand, if the lesion has a peculiar characteristic in the pouch or pocket formation, and this is the only constant characteristic feature of the lesion, does it not have the strongest claim to the name? It seems so to me, and for that reason I generally use the term in preference to Magitot's.

While I generally prefer to use the English language in expressing the name, I sometimes use the Latin equivalent, marsupiosis (pouch disease), or loculosis (pocket disease), adding alveolaris, which, rendered in full, is marsupiosis alveolaris, and loculosis alveolaris (pocket disease of the alveolus). Of the two terms, the latter probably would generally be considered the more euphonious.*

To distinguish one phase of the disease from another, characteristic expressions, or numerals in the natural order of the successive stages, may be used. Thus inflammation of

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*Loc (us)—a place.
(ul)—diminutive suffix.
Locul (us)—a little place, or hole; a fold in the "toga," used as a pocket.
os (is)—a Greek termination denoting the becoming, or the change to a certain state; as, necrosis, "the becoming dead."
Loculosis—the formation of, or "becoming" a pocket; or a disease which consists in the formation of a pocket.
Alveolaris—pertaining to, or situated in, the alveolus.
Loculosis Alveolaris—pocket disease located in the alveolus. Pocket disease of the alveolus.

the gingival margin of the gum (gingivitis) may be known as the first stage, while a later one, when the pocket has become established, may be known as the second, the carious as the third, and the necrotic as the fourth stage.

When, in order to be explicit, it is desirable to express the recurrent form of this disease (after once cured), which is liable in cases where death or low vitality of the cemental wall of the pocket prevents reunion with the pericemental wall, the termination *osis* may be changed to *itis*, thus: loculitis (disease of the pocket), which easily distinguishes it from the original pocket disease.

Another modification may be convenient—the changing of the terminations above mentioned to *i.e.*—thus, loculitic (as in the expression, "the sockets are in a locultic condition).

To reiterate, these brief, explicit and easily spoken terms in a nutshell, are as follows:

Loculosis Alveolaris—Pocket disease of the Alveolus.
Loculitis—Disease of the pockets (recurrent form).
Loculitic—In the pocket disease condition.
First stage—Gingivitis.
Second stage—Pocket established.
Third stage—Carious condition of the alveolar process.
Fourth stage—Necrotic condition of the alveolar process.

FORMULA FOR THE USE OF OSMIC ACID IN NEURALGIA.—Dr. Schapiro of St. Petersburg, proposes the following formula;

Osmic Acid - -	gr. j¾
Glycerine - - -	℥j
Distilled Water - -	℥iij

This preparation has to be kept in a black bottle carefully stoppeerd. This solution will keep for two or three weeks whereas a simple watery solution decomposes in a few days. Dr. Schapiro recommends five drops of the above to be injected hypodermically in the immediate neighbourhood of the seat of pain. In some cases several injections are needed. No untoward circumstances have been recorded as a result of the use of Osmic acid.

Reflections from the Surgery.

AN OBSCURE CASE OF ABSCESS FOLLOWING DENTAL LESION.

Under the Care of CHARLES RATHBUN, London.

I have a case of abscess under treatment which may interest your readers. About two years ago I set a young man's mouth in order, the molars being the only teeth decayed, and after a close inspection, remarked to him at the time, how perfect the anterior teeth were. On Whit Sunday last he complained of acute pain in the right upper central incisor, followed in regular order by extreme sensitiveness to hot or cold liquids, then pain on percussion and, finally swelling over the root and abscess. This was lanced by his medical man, but it continued to discharge profusely and was only checked by the removal of the dead nerve, and filling the root. The subsequent treatment of the fistulous opening with antiseptics and thorough drainage is bringing about a cure. Now I have, of course, only been relating a case of abscess, pure and simple, although in view of the poor health of the patient and the amount of sloughing it was rather serious. The whole of the anterior portion of the root being bare, I noticed a small crack, about two lines in length, right across the tooth, just above the junction of the enamel and the cementum, a flattened explorer penetrated everywhere along the line nearly or quite to the nerve cavity, although air could not be blown through it from the opening made on the lingual side of the tooth when the dead nerve was removed. The patient said he had noticed this crevice, and thought it had been caused by a blow, about 5 years ago.

Now, what I want to ask of your readers, is, "What killed that nerve?" Not the blow, for I am morally certain the tooth was translucent two years ago. If it was exposure of the nerve, or irritation would he not have had premonitory symptoms in the way of susceptibility to thermal change?

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LONDON, AUGUST 1, 1886.

PUTTING BY FOR THE FUTURE.

It has been our duty from time to time to urge upon dentists the importance of providing against the proverbial "rainy day." In no calling is the uncertainty of life and health more conspicuous than among dentists. In the first place their practice is usually purely a personal one. Patients come to any one dentist not because he happens to be one of a number any one of whom would answer their purpose, but because he is favourably known to them by some means or another. It may be friends have spoken highly of him, or his name is bruited abroad in connection with some branch of his profession at which he is especially apt. And when once a patient has learnt to know and esteem a dentist it takes a good deal to shake faith or to induce the patient to go elsewhere for his dental work. This is shown well by the fact that dental practices are difficult property to dispose of to much profit, at least for the buyer. While a man retains his health, while his energy remains, so long does he maintain his grip upon his patients, when once his strength flags so soon does his professional repute begin to wane. And here comes in the grave disadvantages which accrue from the above mentioned personal element in the dentist's practice. For him to have strangers at his elbow assisting him in his consulting room is an impossibility, his clients require his aid and failing to obtain that they go elsewhere. Of course a partnership or an assistant entering a practice while health and vigour last is a different matter, for then the principal can gradually induct the new comer into the practice. But granted that all these evils are likely to fall upon the dentist who becomes ill, what provision can he make to lessen the pinch when it comes? There are many men who are only too willing to lay by, but their incomes are so straightened that any material investment of savings is impossible. Is there no other plan to meet the evil? Happily there is. The grand principle of co-operation, federation of common interests has been called into requisition to effect a system whereby dentists alike with all medical men are able to insure their lives, to provide for a sick pension, or an annuity returnable at a certain age. The British Medical Association has been the means of essaying this good work. The Medical Sickness Annuity and Life Assurance Society enables all practitioners whether dental or medical to obtain a certain immunity of care for the hereafter, and achieves this end by annual payments which are much lower than ordinary assurance companies can effect since its officers are voluntary workers, and its expenses are reduced to a minimum. At a recent meeting the most encouraging financial statement was made.

The auditor's report was most satisfactory. The accounts showed reserves invested amounting to nearly £12,000; a membership of nearly 700; costs of management of less than one-half the estimated amount; and a sound state of all the departments of the Society, which were the sole property of the members; there being no shareholders, and no paid directorate. It was arranged that the annual meeting of the Society should be held during the forthcoming meeting of the British Medical Association at Brighton; and meantime, the report and full particulars are obtainable from Mr. Radley, Secretary, 26, Wynne Road, Brixton.

The importance of habits of providence cannot be over estimated, nor can it be urged that the means suggested are out of the reach of anyone. It will be found that the habit of thrift grows with the individual, he who would save pounds will save his pence. Let any one who has passed to the wrong side of 40 years and has kept his eyes open, consider how many cases of life-long bitterness and misery he has seen due simply to heedlessness and neglect of the future. In the early days of health and prosperity, habits of extravagance and thriftlessness were allowed to dominate and the mind grew careless of the to-morrow. Good health suddenly gives place to prolonged weary illness and carking care to heedless levity. But surely enough has been said, it needs only to impress upon those who have already joined to induce the younger men to commence paying their subscriptions. It is well within the reach of anyone who makes his hundred a year to insure himself against privation during sickness and to provide for an annuity in old age. Were insurance the rule rather than the exception the world would be a merrier place, and wives and daughters would be spared many a hideous trial and degradation.

Dr. Waltee Moxon the well-known physician and pathologist of Guy's Hospital, died suddenly on the 21st. in his consulting rooms. The cause of death is supposed to have been apoplexy or cardioc syncope. Guy's hospital thus loses a second of its brilliant staff by sudden death—Dr. Hilton Fagge and now Dr. Moxon.

Mr. Leonard Matheson, L.D.S., has been appointed to the junior vacancy at the London Dental Hospital. Some dissatisfaction has been expressed by the medical papers at the appointment of a man who holds merely one qualification, while other candidates who are entitled to append six letters and more to their names are set aside. It is always a most invidious matter to select from candidates when they are all first rate men, and one is bound to believe the Leicester Square authorities know what they are about, but it certainly is not encouraging for juniors to see the highly prized, hardly earned surgical qualification counting as nothing in staff elections. All who know Mr. Matheson and his scientific work, and his lectures at the Victoria University, will recognise his great claims to the post he has obtained, and will feel absolutely sure that he will fulfil its functions well and zealously. At the same time it is establishing a wrong principle to overlook the claims of highly qualified men.

TEREBENE AS AN ANTIFERMENT.—Dr. William Murrell the well-known physician and therapeutist who recently obtained the high distinction of an award from the French Faculty has been experimenting upon the antiferment powers of terebene. Dr. Murrell finds a two per cent Terebene solution arrests fermentation in a hay-infusion. Terebene will also check or obviate yeast fermentation. In the same way lactic acid fermentation is influenced by this body. The practical bearing of Dr. Murrell's work on dental practice is that terebene is a useful mouth wash and antiseptic application in all cases when through diseased states of the buccal mucous membrane bacterial invasion of the oral cavity exists.

CHLOROFORM AS A HÆMOSTATIC.—Dr. Ipaak, of Brussels, recommends: Chloroform, two parts; water, one hundred parts. He says that he has used this hæmostatic liquid for several months, and attributes to it the following great advantages:

1st. It acts with truly wonderful rapidity;

2nd. It possesses no escharotic action;

3rd. It is to be had everywhere, and may be prepared instantaneously;

4th. It costs very little;

5th. It possesses no disagreeable effects, and does not hinder the surgeon in his operations.

At a recent meeting of the Louisville Medical Society, Surgeon Godfrey of the U. S. Marine Hospital Service detailed some interesting experiences with this mixture. In his opinion it is the coming hæmostatic.

Dr. Dodge of New Jersey, has employed this prepration a number of times, and finds when used about the gums and teeth, it possesses for the dentist the advantages of leaving no clot of blood nor discolouration of the surface.

He uses it upon cotton, and has also applied it with a dental syringe or pipette, and has thus far found it satisfactory.

It is certainly simple and palatable.

Foreign Bodies in the antrum of Highmore.—According to the report of the Medico-Chirurgical Society in the St. Louis Courier of Medicine, Dr. Mulhall presented three foreign bodies which he had removed from the antrum of Highmore of a lady, aged 23. Having diagnosed the case as one of purulent catarrh of the antrum of the right side, he sent her to a dentist with instructions that the first molar tooth be extracted and a gold tube be made with a clasp which would fit around the first bicuspid so as to keep it in place. She went to the dentist and had the tooth extracted, and he bored through the alveolus a proper opening into the antrum and washed out a quantity of fetid pus, but she stated that she did not think she could afford the tube. She went home and her husband undertook to make a tube that she could put into the antrum. She at once began to improve, and was getting along quite well under the use of carbolic acid and iodine washes, when the plug suddenly disappeared. Her husband a second time undertook to wash the antrum, and put in a hard rubber plug to keep the opening patulous till the next washing. Some two months after, this also disappeared. After the first six weeks the discharge had not been purulent, but when she got these foreign bodies in, the discharge again became offensive in character. As it was pretty evident that foreign bodies were in the antrum, he concluded to operate for their removal. The second molar had been removed, and so had the second bicuspid. First, separating the cheek from the jawbone as much as possible, avoiding the infra-orbital artery and cutting back as far as he could where the wall of the antrum is thinnest, and where there is most space to see into the cavity he made, with a chisel, an incision about an inch long into the antrum above the alveolus and at right angles, far back. He then had an opening about as large as one's thumb. Introducing a pair of forceps he succeeded after some difficulty in removing a hard rubber plug. She said, "Now I know there are two more there, because that is the first one I put in." The doctor was able to see another one, which he removed with the forceps. Searching for some time he finally found a dark object that he grasped with the forceps and succeeded in getting out. A drainage tube was introduced because he proposed to treat the cavity through the opening he had made. The other opening through the socket of the first molar has closed up. As soon as she recovers he will withdraw the drainage tube and allow the cheek to close the opening.

Abstracts of British & Foreign Journals.

THE INDEPENDENT PRACTITIONER.

DENTAL CHEMISTRY.

By S. B. Palmer, M.D.S., Syracuse, N.Y.

Chemistry is defined as that branch of science which treats of the composition of substances, and of the changes which they undergo. It may be divided into four parts.

First.—Inorganic, which treats of minerals or inorganic substances.

Second.—Organic, which treats of substances that form the structure of organised beings and their products, whether animal or vegetable.

Third.—Practical or applied chemistry, which treats of the manufacture of the products of chemistry, their application to commercial purposes and of the conditions essential to their best use.

Fourth.—Pure chemistry, which treats of the element constitution of substances, of the laws of combination, and of the mutual reactions, and the relations therein involved.

It explains modes and preparations of composition, and the process of decomposition and decay, and also the nature of the elements and of their compounds Dental chemistry, taken in the operative and mechanical department, involves each and all of the above named divisions.

No dentist can thoroughly understand his work unless he knows chemistry.

Chemistry teaches that all matter is composed of about sixty-five simple elements. From these, by various combinations and proportions, come the countless number of mineral, vegetable, and animal forms which comprise, surround, and inhabit the globe. About three-fourths of this number of elements are classed as metals, and one-fourth non-metallic.

The elements, about twelve, enter into the dental organs. Thirteen only, taken from both classes, form all the structures in which life is manifested.

Leaving out proportions, dental chemistry teaches that human dentine consists of cartilage and vessels, phosphate of lime, fluoride of calcium, carbonate of lime, phosphate of magnesium and soda, with chloride of sodium. Dentine is composed of phosphorus, fluorine, calcium, carbon, magnesium, and sodium.

Let us analyse carbonate of lime, a component part of the teeth, also of the salivary calculi, as well as limestone and marble. Take a piece of marble and heat, a gas known as carbonic acid gas and quicklime are produced. The gas when treated by heat can be separated into carbon and oxygen. Send a current of electricity through the quicklime and white metal, calcium, and oxygen are produced; as no further division can be effected carbonate of lime is said to be composed of carbon, calcium, and oxygen three simple elements. Thus the other compounds of tooth structure, chemically treated, at once reveal their constituents or simple elements. By reversing this order, compounds are formed from simple elements.

There appears to be no limit to the combination and changes which may be produced by the union of even the thirteen elements which enter into living forms. By the laws of affinity they unite in definite proportions, which may be determined with mathematical accuracy. What affinity really is is unknown. Elements combine in different proportions, giving very different compounds, yet each compound has its exact proportion. Nitrogen and oxygen, which are tasteless, when combined in equal proportions give nitrous oxide, which is sweet. One part nitrogen and five of oxygen give nitric acid, which is intensely sour.

We must bear in mind that elements combine according to their affinity for the elements present. When a new element is introduced, with greater affinity for any one in the compound, the old relations are broken up and a new compound is formed. Thus alcohol and camphor-gum will hold peaceable relations unless water be added. In that case, alcohol will unite with the water, and at once reject the camphor, which will appear in white flakes upon the surface. Thus acids affect tooth structure, the acids are the result of fermentation. In the laboratory cavities cannot be produced by immersing teeth in acid, but when the experiments are conducted upon the principle that governs in the oral cavity, they furnish like results. The simplest experiment is accomplished by the electric current in a neutral or slightly alkaline solution, one pole of the battery furnishing acid to dissolve the dentine, while the lime is deposited at the other pole. Thus we may understand the process of disintegration where food is confined between teeth or in cavities. Decomposition goes on undisturbed by the surrounding fiuids.

In teeth which are filled with metallic fillings, unless certain conditions are observed, decomposition continues. Dryness is essential : that is, if the plug is imperfect, or the dentine too porus to prevent fluid circulation, thermal changes through the moisture excites sensibility, and in time destruction of the surrounding tissue follows. Amalgams which contain copper and silver, often by the oxides and sulphides arrest decay in frail teeth, but good amalgams, or rather such as we would choose to insert, as well as gold, need to be insulated, or so inserted that the porous dentine and the irregularities and angles of the cavity are filled with some indestructible varnish, the only method to my knowledge which will preserve an amalgam filling bright upon the inner or wall surfaces. One thing is certain ; when amalgam remains bright next to dentine, there is no decomposition going on.

URÆMIA, AND ITS EFFECTS UPON THE TEETH.

By Dr. W. J. Reese.

He holds that uric acid in the blood causes serious trouble in the mouth. Dr. Beale estimates uric acid in healthy human urine to be from one-half to one grain in 1,000 grains, *i.e.* eight grains excreted daily by a healthy adult. Its presence is detected by the addition of a drop of nitric acid to the suspected deposit. If uric acid is present, brisk effervescence will take place. Evaporating over a lamp a reddish residuum is left, to which the addition of a drop of ammonia will give a rich purple tint, from the mur-exide or purpurate of ammonia. Suspected fluid is to be treated with a few drops of glacial acetic acid, in a watch glass. Immersing filaments of silk or tow, and keeping them under a glass shade in a warm place, crystals of uric acid will be deposited on the filaments. Suspected saliva may be collected on a watch glass and evaporated over a spirit lamp, adding a drop of nitric acid and continuing the evaporation, stirring from the bottom with a stick dipped in ammonia. Uric acid, if present, will be thrown down as a red precipiate.

The proportion of uric acid in the urine varies with the diet used and in different diseases; acute gout, .830; rheumatism, .802; heart disease, .711; Erysiplelas, .679; Excessive Debility, .078; in Health, .250 (Sansom).

It is retained in the blood by diseased action of the kidneys. During convalescence from gout or rheumatism large quantities are carried off in the urine and by the emunctories.

The hæmorrhage diathesis is also intimately associated with uric acid troubles. Nasal catarrh, in connection with Pyorrhea Alveolaris, is probably due to the same cause. The effect of uric acid in the blood, upon the teeth, is a *phagedæna pericementi*—an eating away or absorption of the peridental membrane. Pyorrhea Alveolaris is a misnomer; uric acid produces violent inflammation and intense pain, but rarely suppuration, except in contact with the fluids of the mouth, and not always even then. At the roots of the teeth, where protected from the air and the saliva not in contact, there is no suppuration. There is sometimes a bony deposit instead of absorption, and sometimes both of these conditions may exist about the same tooth, as in the superior molars, where, on the palatine root, the gum and alveolus will often be absorbed without snppuration, while the labial root will be exostosed, though apparently otherwise healthy, especially if it has no antagonist. The formation of tophus on the roots of the teeth is associated with uric acid trouble. When present, absorption always precedes the deposit by from one-sixteenth to one-eighth of an inch. Sometimes the uric acid deposit and deposits of salivary calculus—phosphate of lime—will be found on the same tooth, the latter being of a lighter colour and more porous. Women, when irregular in menstruation, or during pregnancy and nursing, have, in addition to the deposits, the gum festoons purple, and bleeding at the slightest touch, sometimes from the quantity of blood and lack of inflammation, constituting a form of vicarious menstruation.*

The action of uric acid in dissolving the peridental membrane is the same as in the articulations and periosteum in other parts of the body.

The systemic treatment is exercise in the open air, hot baths, keeping the skin clean and the pores open. Use vegetables and lemons freely, avoiding meat diet, as also alcoholic, vinous or malt liquors.

For local treatment, a surgical operation is rarely necessary. The urates dissolve in nitric or acetic acid; the efficacy of peroxide of hydrogen is said to be due to the nitric and muriatic acid used in the manufacture. Uric acid incrustations can also be dissolved by potash, soda or ammonia, the alkalies uniting with the uric acid. Chloride of sodium will dissolve the deposits, but is very painful to the gums.

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*To check profuse hæmorrhage after the extraction of teeth, take a very soft wax impression of the parts—trim it out and fill with a soft batter of plaster and apply immediately, pressing down firmly until the plaster is set. This will succeed after all other methods have failed.

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Creta Prep.	℥ii
Bicarb. Soda (Squill's) Pulv. South Amer. Soap— Tree Bark	*aa* ℥i
Ol. Wintergreen	q. s.

(Pulv. Orris Root may also be used).

This powder packed round the gums at night, in connection with peroxide of hydrogen rubbed briskly over the deposits by the dentist will remove all deposits.

The powder is also said to be a specific for sensitive dentine at the gums. The pockets should be syringed with the peroxide, and the application made to the deposits by means of cotton wrapped on an excavator. The peroxide should not be exposed to the light. Robinson's Remedy is very efficacious, the potash neutralizing the uric acid, it must be used with great caution.

℞

Hydrate Chloral	
Spts. Cochlearea	*aa* ℥ii

applied with a mop, will be found equally efficacious, and safer if a napkin is used to protect the lips.

OHIO STATE JOURNAL OF DENTAL SCIENCE.

ORAL DISEASES—NECROSIS OF THE LOWER JAW.*

By J. M. Martin, M.D., Lecturer on Oral Diseases in the Dental Department, University of Michigan.

The lecturer points out that surgeons and physicians frequently overlook oral as well as dental lesions.

The results of such lesions soon reveal themselves in the general health. First, any interference with the act of mastication overloads us with a mass of raw material that cannot be advantageously utilized for building and repairing.

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*Read before the Michigan State Dental Association at Ann Arbour, Michigan, March 17th, 1886.

Food improperly masticated imposes more work upon the other organs and causing derangements especially upon those debilitated by age or other causes.

Various other results follow varying from slight irratibility or diarrhœa to convulsions, emaciation, and death. Dentition is a *normal physiological process*, but deviations are numerous caused by bad hygienic surroundings, *too early* administration of solid food, and others. When the child arrives at a certain age, almost every illness is referred either directly or indirectly to dentition. A babe fed with meat, bread, potatoes, and other solid food before its organs are able to digest and assimilate them, grows ill and its ailments are put down to "cutting teeth."

The temporary teeth are usually erupted between the sixth and thirteenth month, beginning with the central incisors; and physicians and dentists too often diagnose dentition as the cause of most derangements of that period, and far too often recommend lancing of the gums, not knowing what ought to be done. This practice is proper when indicated and at the proper time; but often it is done too early and more harm than good results; for example, if the gum over a tooth is lanced—before the tooth is ready to be erupted—a cicatrix forms over the tooth, and it being firmer than the original structure, there is more disturbance when the tooth is erupted. When the gums are tense and congested, and by examination the tooth can be felt beneath, then the gum may be lanced. Inflammation of the root or base of a tooth without external signs of inflammation at the apex of the gums is often overlooked, if the inflammation is at the root of the tooth, due to backward pressure by the structure in front, the inflammatory signs are at the base of the gum and not at the apex, and instead of the child experiencing relief by gradual pressure forcing the blood from the tissues over the tooth, there will be an actual increase of pain.

Inflammation and neuralgia are often mistaken. Toothache is caused by dental caries, periostitis, caries and necrosis of the jaws; abscesses of teeth, gums, jaws, and surrounding structures; inflammation of gums, dental pulp, and surrounding structures; death and decomposition of dental pulp; ossification of dental pulp; tumours of the teeth, gums, or jaws; reflex action due to derangements of digestion, &c. A plug of hard wax in the ear may cause the most severe form of toothache by reflex action.

Diseases of the teeth may produce diseases of the jaws; as periostitis, caries, necrosis, and abscesses of the gums or jaws, diseases of the salivary glands, tonsils, cheeks, throat, nose, ear, and a long train of general disturbances, as neuralgias, blood poisoning, and derangements of digestion. Disease of the teeth, excite neuralgias of the most varied and peculiar forms, *e.g.*, tetanus, trismus (lock-jaw), &c. Many cases of convulsions in adults have been traced to diseased teeth. Directly disease of the oral structures predisposes or causes syphilis, fevers, &c., anything that alters the secretions of the mouth or alimentary canal produces a morbid state of the secretions that injures the teeth.

There are many abnormalities and diseases of the gums, such as tumid gums, hypertrophied and atrophied gums; alveolo dental abscesses, abscesses of the antrum and other structures; inflammations of all parts; tumours of all parts, as polypoid, fungoid, fibroid, sarcoma, and cancers; deformities of the teeth, gums, jaws and palate; diseases and deformities of the tongue, lips and throat. A case of necrosis is then recorded.

The patient, Louis Hagberg, aged 23, a Swede, living in America, working in the saw mills in the summer, and in the lumber camps in the winter. The patient was never ill before coming to America, and since his arrival has been well until last July (1885).

The 10th of July, 1885, after eating dinner, he suffered pain about the right molars of the lower maxilla, he termed it toothache, the pain continued during the afternoon, and at night the right side of the face began to swell over the lower maxilla; pain and swelling increased for three days, when the face was greatly swollen and distorted, the teeth of the lower jaw began to loosen, and at the end of a week, three of the teeth had dropped out, two on the left side (the lateral incisor and first bicuspid) and one on the right side (the first bicuspid) and the rest of the teeth of the lower maxilla were very loose. After three days, the pain was very severe and swelling so great that he could not open his mouth. He poulticed the right side and had a carious molar removed. Two days later the swelling was nearly gone from the right side, but the left side was greatly swollen ; the swelling having extended around the jaw to that side ; the poultice was applied to the left side but the swelling was not reduced. The gums also were much swollen, spongy, and very sensitive. For three weeks the pain was very severe, the patient was much reduced by it and exhausted for want of food. Many abscesses then formed, an opening occurred on the right side near the back molar and considerable pus escaped ; several other openings soon occurred in different parts of the jaw and offensive pus flowed freely from all of them. With the evacuation all pain ceased, but profuse suppuration continued. The patient although free from pain became very exhausted by the profuse discharge of pus. Some teeth were removed and some necrosed bone came away.

The patient came to the hospital on November 6th, pale and much reduced, with a large, hard swelling on the left side of the face, over the muscles of mastication ; there were several sinuses leading to necrosed bone of the lower jaw, from which pus was flowing. The swelling when seen could be slightly moved independently of the jaws, proving it was not a bony or cartilaginous growth attached to the jaws. One sinus opposite the left back molar led back toward the centre of the growth for two inches, from which a small amount of pus flowed, the flow was increased by pressure on the less firm central part of the tumour, thus proving the presence of pus near the angle of the jaw. The sinus leading to the supposed centre of suppuration was enlarged with a bistouri and grooved director and a tent put in ; the flow of pus was slightly increased, but drainage was incomplete. The cavity was washed out with antiseptics. The patient was gradually growing weaker with signs of blood poisoning. Dr. Martin made a free incision into the centre of the tumour near the angle of the jaw, close to, and parallel with the infra-maxillary nerve, offensive pus was evacuated, the parts cleansed, and warm flax seed meal poultices applied for forty-eight hours, when the acute sensitiveness was gone; the parts were then explored with a probe and a small amount of dead bone discovered near the angle of the jaw, but not yet separated; the pus cavity was found to be of irregular shape extending among the muscles of mastication. By this external opening, *free drainage*, one of the two great indications for treating abscess was met, and the other, *cleanliness*, obtained by injecting a solution of carbolic acid and iodine. (A solution of 1-100 of the first, 6 parts to 1 part iodine, gradually increasing the amount of iodine.) July 15th, a small piece of dead bone separated when suppuration rapidly grew less and the sinus began to close from the bottom, stronger injections were then used. On February 13th the sinuses were entirely closed, the patient could open his mouth freely and masticate his food, the remaining teeth in the lower jaw had become firm in their socket, and he made a good recovery.

A similar case is cited from the *American Journal of Dental Science.* The patient, a boy, previously healthy became affected with toothache which began in the first left lower molar, and an alveolo-dental abscess formed, but was not treated, the tooth was not removed, and there was a fetid discharge from about the tooth; there was a swelling over the jaw, several sinuses formed, suppuration was profuse, and the patient greatly reduced. A large part of the left side of the lower jaw became necrosed, the dead bone separated, and the patient recovered.

Dr. Erichsen states that necrosis of the lower jaw may come from undiscoverable causes. This is important to dentists, who are often unjustly accused of producing diseases with which they have no connection whatever.

Dr. Martin advises in the early active stage, a good brisk cathartic, 6 to 10 grains of calomel followed in from four to eight hours by a large dose of saline cathartic, well diluted; follow this by 10 to 15 grains Dover's powder or equivalent of some other opiate, to allay all pain, and repeat the dose as often as needed. If the pulse is hard, active, and the skin hot and dry, give drop doses of tinc. aconite every half hour in water until the skin is moist and the action of the heart is modified. Scarify the gums by free incisions down to the bone for two reasons: 1st, local blood-letting relieves the blood pressure, and 2nd, it gives free vent to any pus that may collect under the periosteum, thus preventing extensive separation of the periosteum and extensive necrosis in many cases; the gums may be painted with tinct. iodine, hot fomentations applied over the swollen parts, and similar remedies.

Later on iron and bitter tonics are required; and in specific cases, alteratives; without alteratives in specific cases, the patient cannot be cured, but with them, syphilis yields promptly.

The suppuration being profuse, the patient, in many cases, is rapidly debilitated, and nourishing food, tonics, and sometimes stimulants are needed.

The sinuses must be treated with injections of antiseptics, such as per chloride of mercury, carbolic acid, iodine of listerine, &c.

Literary Notices and Selections.

A CRITICAL ESSAY ON THE DEVELOPMENT AND MINUTE ANATOMY OF THE TEETH IN HEALTH AND DISEASE.

By J. L. WILLIAMS, D.D.S., Philadelphia, Pa.

Mr. President and Gentlemen: If I acknowledge the feeling of weakness which often prompts men to shrink from the consequences of placing themselves in a position where they are likely to be misunderstood or misinterpreted, I must

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*Read before the First District Dental Society of the State of New York at its 17th Anniversary, held December 9th, 1885.

also plead the extenuating circumstances that such feeling of weakness is born of past experiences, which have taught me there are but few men who are sincerely grateful to those who point out their errors of opinion or belief. This is especially true of those who enjoy something of an intellectual reputation which may be founded, to a greater or lesser extent, upon such errors. Therefore, to criticise with perfect frankness opinions which have become a matter of fixed intellectual pride is often regarded as an injudicious proceeding.

There is too frequently evident in all critical efforts a quality which has regard chiefly for that artificial adaptation to environment known as expediency,—an attempt to conceal more than is revealed, but often to those who read between the lines revealing more than is concealed.

It is the rare exception that discussions of questions of truth or error before scientific or professional associations are free from that exhibition of intellectual gymnastics which seeks by some trick of voice, or emphasis, or rhetoric, or what passes for logic, to win the applause of the moment. At the last, however, only the simple truth remains, and we shall all probably come to see that this exists quite independently of our intentional or unintentional efforts to elucidate or obscure it. But if I correctly apprehend the purposes of those who are to take part in this discussion, the meeting is destined to be a memorable one; and I trust that it may also prove a dignified exception to many former experiences in being animated by and conducted in that spirit of kind earnestness which should actuate all fellow students and lovers of the truth.

The principal object of this essay, as annonnced, is the consideration of certain features in the minute anatomy or microscopic morphology of the dental tissues in health and disease.

The reason why I shall preface this consideration with some remarks on the development of the teeth, is that I have grown more and more to see the futility of any attempt to arrive at unamity of opinion concerning either morphology or function, except through a careful study of the history of the development of the organism; and not only of the individual organism, which is the immediate object of our studies, but of the lower forms of life which lead up to it.

While I cannot believe that these higher and more complex organisms have evolved themselves by a process of slow but continuous development from a more lowly condition, but rather that the creation of each succeeding higher form of life has been effected by the superposition, or rather the infusion of a higher quality of life energy from the source of all life, yet I cannot but recognise that there is an intimate bond of relationship between all forms of life, and that, as I have before said, the complex and oftentimes obscure conditions, which prevail in higher forms of life are expressed in simpler and therefore more easily comprehended terms in lower forms. Therefore, I repeat a statement that every biologist of note of the present day will confirm,—a comprehensive knowledge of the structural relationships and functions of an organism is only te be gained by a careful study of the history of its development, both from the standpoint of ontogeny and philogeny. This statement is quite as applicable to the teeth as to the organism as a whole or to any of its parts; and upon it is based the views presented in this paper.

There is one other principle to which I wish to call your attention, and the importance of which I wish to emphasize. It is that, while the organism is developed and exists as a unity, while it is inter-dependent in all its parts to the extent that every molecular change which occurs in the finger tips modifies, in its degree, other changes which are occurring in remote parts of the body, yet the development and maintenance of every part is under the special domain of its own inherent typal energy and environment. There are individuality and structural peculiarities as well as unity in development, and this in accordance with the function or use to be performed. This principle has not been observed by those who have carried similarity of development, structure, and function so far that it has become identity The importance of this point will be seen as we proceed.

If I were asked to express in a single sentence all that is meant by the term development as applied to animal organism I should say it is the focalizing of life-energies in certain territories in accordance with typal ancestral endowments and limitations. In elaboration of this, I would say that, in the development of complexity from simplicity of structure, the first observable departure from uniformity is an increased activity in the formation of the elements or corpuscles at the point where the new departure is to take place, or the point from which the development of the new organ begins. And I would characterise the initiative impulse which leads to this more rapid cell-proliferation, as it is usually called, as the focalizing of life-energies at this point. It is the formation of a new centre from which the circumference of the new organ will be unfolded, and this in accordance with that great universal law, applicable alike to corpuscle, organism, or world,—"creation proceeds from centre to circumference."

(*To be continued.*)

Dental News.

CONVERSAZIONE OF THE STUDENTS' SOCIETY OF THE DENTAL HOSPITAL, LONDON.—A most successful conversazione, given by the Students' Society of the Dental Hospital of London, was held at the Marlborough Rooms, Regent Street, on Tuesday, July 20th, at which about three hundred guests were present. After the reception by the president of the Society, Mr. Geo. W. Parkinson, and Mrs. Parkinson, and Mr. Morton Smale, Dean of the School, the annual distribution of prizes to the successful students of the London School of Dental Surgery took place, Mr. J. Smith Turner being in the chair and giving away the prizes. After the distribution was finished, a capital vocal and instrumental concert was given in the upper hall, consisting mostly of glees, interspersed with solos, by Messrs. Fairbank, David Hepburn, Alfred Smith, and H. Lloyd Williams, and a violin and piano, forte duet by Mr. and Mrs. Frank Barnard. The concert finished up with an admirably rendered selection from H. M. S. Pinafore. During the evening Coote and Tinney's Band performed a choice selection of music in the reception room, and electrical and microscopical exhibits were on view in both rooms. This is the first time the Students' Society have given a Conversazione on so large a scale, and they are to be congratulated on having scored a grand success.

The following is a list of the prize winners of the London Dental Hospital and School during the past year :—

SAUNDERS' SCHOLARSHIP.—Mr. H. Williams.

WINTER SESSION, 1885-6. MECHANICAL DENTISTRY.—First Prize, Mr. H. J. Moore ; Second Prize, Mr. H. Williams ; Hon. Cert., Mr. F. M. Ludbrook and Mr. A. T. Croucher.

METALLURGY.—First Prize, Mr. H. Williams ; Second Prize, Mr. F. M. Ludbrook ; Hon. Cert., Mr. H. J. Moore and Mr. A. E. Baker.

OPERATING PRIZE.—Prize, Mr. J. F. Colyer ; Hon. Cert., Mr. G. O. Whittaker, Mr. A. Kendrick, and Mr. A. T. Croucher.

SUMMER SESSION, 1886. DENTAL ANATOMY.—First Prize, Mr. H. Williams : Second Prize, M. J. Moore ; Hon. Cert., Mr. A. E. Baker, Mr. F. M. Ludbrook, Mr. A. W. Frost, Mr. G. H. Badcock and Mr. J. S. Acton.

DENTAL SURGERY.—First Prize, Mr. A. Baker ; Second Prize, Mr. F. M. Ludbrook ; Hon. Cert., Mr. H. J. Moore, Mr. H. Williams, Mr. A. W. Frost and Mr. W. A. Hooton.

ASH'S PRIZE.—Mr. A. T. Croucher.

STUDENTS' SOCIETY'S PRIZE.—Mr. C. A. Barstow.

APPOINTMENTS.

W. H. Waite, D.D.S., L.D.S., has been appointed Consulting Dental Surgeon to the Liverpool Dental Hospital.

R. Edwards, M.R.C.S., L.D.S., has been appointed Dental Surgeon to the Liverpool Dental Hospital.

British Journal of Dental Science.

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"GASSING," "CHECKING" AND OTHER INCIDENTAL CONDITIONS OF CONTINUOUS GUM-WORK.

By Robert Marston, Leicester.

Dentistry ranks amongst its workers Englishmen, who long ago encountered and conquered the difficulties which were spoken of at the Odontological Society's meeting in April. Yet, notwithstanding the remarks of the honoured president upon the importance of Dr. Walker's communication, none have volunteered the information required, although the act which they are well able to perform, of doing full justice to the subject, would have cost them so little.

Dr. Walker's essay on porcelain was both interesting and instructive, and will do much towards clearing away, the too common distrust of the porcelain process, and the fitness of that material, for constituting dentures, and representing the oral tissues. He fully demonstrated the practicability of the process, and the suitableness of the material. He admitted however, that even now, the behaviour of silicates, or the porcelain compounds used, is not fully understood and the absence of this knowledge, is likely to result in "checking," a condition, or effect, shown by the specimen, which he candidly placed with his perfect appliances upon the tray. That is an honest and a telling manner, of introducing new things, it shows how much is already known, and distinctly points to the direction whence useful information must come, thereby localizing the energy of those who are able and feel an inclination to apply themselves to the development and the advancement of this beautiful art. "Checking" introduced itself to

Dr. Cunningham's notice also, and by his effort to master it, he has rendered good service to the profession, by proving the uselessness, of any attempt to draw manufacturers, and by eliciting other valuable information, for he said the S.S. White informed him that "*Dr. John Allen himself uses the gum body and enamel of our own manufacture.*" Now we may reasonably infer from that information, that Dr. John Allen saw the advisability, if not the necessity, of making that departure and if his unbiassed, receptive andprogressive mind supposed that course was necessary, then that necessity comes to others, emphasized by the endorsement of a world-renowned genius, and the most brilliant expert in this department of dentistry. The answer to Dr. Cunningham's query was not so unsatisfactory as he evidently thought it to be, for in very truth it points to the cause of his complaint, namely, the proneness of the materials to check, and it quite as forcibly shows the remedy, namely, Dr. John Allen's example, of using instead, other materials less prone to that tendency. Dr. Walker's method of introducing his subject, is that adopted by all dental authors, but as the historical part of the programme is never fairly executed, I will, by your favour, first touch upon the history of continuous gum work, and subsequently treat the more practical part of the subject. Whilst giving honour to those whose names are, or ought to be, inseparably connected with the porcelain process, we should be careful to give honour to whom it is due, justice claims this tribute to their memory, and history demands the records of facts in the order of their existence, but dental authors have not been too careful in their research for information relative to, the history, and practice, of this branch of dentistry.

108 years ago, Francais Gillanders took out his patent, No. 1199 on October 22nd. for producing a vitrified enamel, for facing bone and ivory dentures. In the year 1820, Delabarre of Paris, was working the porcelain process. In 1824 Dr. John Allen commenced his experiments. In 1849 George Fellows Harrington, patented his invention, No. 12717 August 1st, for continuous gum facings, and dentures, made without special reference to any pnrticular case, but applicable

to all edentalous jaws, perfect coaptation being obtained by the addition of a bone or ivory base. In 1850 Cuthbert Dinsdale took out his patent, No. 1304, April 15th. For porcelain gums. In 1852, Dr. W. Hunter generously published his modes, and formulas. In 1853 John Allen's modes, and formulas were patented in this country by Geo. Laurie, as a communication to him from John Allen. Patent No. 2386, Oct 15, and in 1854, Her Majesty's Commissioners granted letters patent, No., 180 Jan. 24, to W. Massey for Porcelain gum formulas.

These specifications show us what changes were introduced in the formulation of porcelain materials, as well as in the modes of using them, both as it relates to the fabrication of dentures, and the method of replacement advocated by their respective authors. Therefore to that extent, the light of their facts, discovers to us, all the phases of the development, which continuous gum work has undergone from the earliest period of its history, to a date whence memory catches up the train of improvements, and makes us cognizant of all the most important changes related thereto, which have been effected up to the present time. Every manufacturer of dental porcelain, has had to contend with those discouraging difficulties called "gassing" and "checking." A comprehensive knowledge of their cause is not absolutely necessary to the construction of a denture in porcelain, as this deficiency may to a great extent, be compensated by a strict observance of "furnace-going." In just the same way a glass maker is enabled to predetermine the quality of his metal, although a chemist, unless he acquired a similar experience, could not by any means predetermine either the analysis or physical qualities of the ultimate product of a given formula, because the nature of the product is varied by regular and irregular maintenance of heat as well as by the duration of high and low temperature. Fortunately neither "gassing," nor checking occur in the majority of cases, yet the tendencies are constantly harassing and so long as these phenomena remain enveloped in mystery, every denture alike will be liable to the same mishaps. Indeed, misdirected cautiousness, may not only fail as a preventative of the mischief, but may actually cause it. Generally speaking, gassing and checking are the two extremely opposite effects of unskilful fireing, viz: the too rapid fusion, and the too prolonged heating up of the porcelain compounds; other causes, however, are productive of the same phenomena. Nothing but a knowledge of the cause can lead to the discovery of a successful remedy for its effect, and in the absence of this knowledge, nothing sensibly exists to forewarn the manipulator of the disappointment upon which he verges. In showing the inherent and external conditions conducive to the change called "gassing" it is necessary to say that dental porcelain is composed of metallic oxides, the metallic elements of which vary in their affinity for the oxygen with which they are combined, and so extreme is the dissimilarity that whilst some resist all the influences incidental to the porcelain process, whether skilfully or unskilfully conducted, others are decomposed by any irregularity in its conduction, any change in the chemical composition of one or more components of the porcelain material alters the physical qualities of the whole mass, and produces either a desirable and predetermined effect, or a condition foreign to expectation and fatal to the purpose intended. The operation of this change is called the play of chemical affinities and does not acquire the appellation "gassing," until it involves the destruction of colour, translucency or other normal quality of the baked material, although the term may properly be extended to all those appearances indicative of this constitutional change of the porcelain components in any degree. The common cause of this change is carbon, or sulphur, or some combination of these elements, although other elements and their compounds exert a similar action, these, however, not being ordinarily met with do not come within the present consideration. Carbon may introduce itself in varied form, as camel-hair, paper-chafing or lint from woollen, linen, and silk fabrics, workroom dust, gums, gum-resins, resin, turpentine, fixed and volatile oils, mineral-wax, vegetable-wax, bees-wax, pure glycerine, etc., these substances, however, carefully dissipated, leave a carbonaceous residue, in the porcelain material, although, many of them may be totally dissipated when otherwise treated. The presence of sulphur generally arises from a deficiency of atmospheric air, the oxygen of which is required to convert that element into an acid, which, in the quantity met with, does not perceptibly injure the porcelain. The deficiency of air, may be caused by choking the flue above, instead of the draught holes beneath the muffle, when regulating the heat and also by unskilfully adjusting the proportions of gas and air in gas furnaces whether the latter are constructed on draft, or injector principle, likewise a deposit of carbon, the injurious action of carbonic oxide as well as the destructiveness of other products of imperfect combustion may result from that cause. In gas furnaces, sulphur is rendered inert by admitting air to the flame above the burner, but this reduces the maximum temperature of the arrangement. The same result may be obtained without materially altering the furnace heat by piercing a small hole through the muffle plug, but these contrivances cannot otherwise correct the mischief naturally created by the defective working of the furnace whether that arises from unskilful management, or other cause. A close observation of the operation called gassing followed by consideration of those appearances which indicate the progressive stages of this chemical change, enable us to understand its cause and nature so thoroughly that we can produce or prevent the phenomenon, *ad libitum*. I will now endeavour to demonstrate to the mind's eye, the gassing of a thick porcelain block, and will suppose that the block prepared for fireing has been placed within the already heated muffle, which is immediately closed and its temperature run up with all possible speed. An occasional glance at the porcelain will show that a dark film first creeps over its surface and then gradually pales away, subsequently a greasy appearance diffuses itself, followed by the yellow passing into a dirty yellow, greenish, bluish, or bluish black colour (according to the proportion of pigment), and if the heat has been attained with sufficient celerity, the mass swells, becomes porous, and its exterior blistered. We may readily perceive that the first appearance was occasioned by a film of carbonaceous matter, probably in the first instance carried to and deposited on the surface by capillary attraction of the water during its egression, for at this stage the porcelain has not become heated sufficiently to permit decomposition of the water and the union of its oxygen with the carbon, or both water and carbon would have been eliminated, as carbonic acid and hydrogen gases, or else as carbonic oxide and hydrogen according to the atomic ratio of the elements permitted by the proportion of water and carbon present. Only a part of the carbon has been brought out in the manner described, and the remainder is left disseminated throughout the mass, but as the water leaves, air enters and fills all the spaces around the granules composing this mass, and would certainly convert the remaining carbon into a gaseous compound, and in that way effect its entire volatilization, but this action is interrupted by the sweating of the glaze which begins at a temperature considerably below that required for actual fusion of the porcelain. This sweating commences on the surface and is but slowly conducted to the interior, because the porcelain material when in a pulvulent, or granular condition is one of the most perfect non-conductors of heat at present known therefore through unskilfulness the exterior may become vitrified before sweating of the interior has begun and before all the carbon has been dissipated. The imprisoned carbon, subsequently sets in operation chemical affinities by abstracting oxygen from those chemicals which have the weakest affinity for it and during the action effervescence is observed to be going on, and is caused by the reduction of the unstable compounds, and evolution of the gaseous product, which being pent up, accumulates in quantity and expansive force until the same is superior to the molecular cohesiveness of the mass, which it ultimately sponges and distends as in bubbles it comes to the surface and disengages itself. Probably a thousand and one reactions might be predetermined in formulating porcelain, but whenever gassing, as understood in its relation to dentistry, occurs it is effected in the manner concisely, but for all practical purposes sufficiently described by the foregoing exposition. Carbon or sulphur invariably causes the mischief and that effect may be evaded through an avoidance of the cause. In extending the remarks to discolouration of porcelain, I may say that gold when permeating the silicate ar red pigment is not itself affected by either carbon or sulphur as ordinarily met with, but its colour may merge into the dense discolouration caused by uncombined carbon, or the partial or complete reduction of one or more metallic oxides, or the formation of other chemical combinations, or the opacity of the porcelain consequent on the partial evolution of gas, or other causes. Therefore it does not necessarily follow that loss of colour implies destruction from decomposition of the pigment, but in dental practice whenever the yellow changes the pipment is chemically decomposed simply because this pigment is the most unstable of all the constituents of dental porcelain. Nor does the evolution of gas necessarily accompany every play of chemical affinity because true atomic compounds may be predetermined to give and take in obeyance to the common law of combination without altering the composition of a formula, so far as that relates to its original weight, and the proportions of its constituent elements, although its components as originally constituted be destroyed in the reaction, nevertheless the plan called gassing necessarily causes an evolution of gas if fully conducted.

(*To be concluded.*)

PAINLESS PLAN OF CORRECTION OF IRREGULAR TEETH.*

By J. N. Farrar, M.D., D.D.S., New York City.

Mechanical appliances for regulating teeth are constructed upon different principles of mechanics, now known as the probable and the positive ; so called because one is sure and definite of action, while the other is not. These two plans not only act upon different mechanical principles, but have also peculiar characteristic influences upon the functions of the tissues involved.

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*Reported from proceedings of the King's College, N.Y., Medical Society.

The plan of construction by probable mechanics implies the use of elastic materials, such as springs and rubber, in such a way that a continued force is maintained upon the teeth to be moved, the management of which is not only generally beyond the control of the patient, but is difficult to be made to sufficiently harmonise with physiological functions to attain the highest possibilities with the least pain.

The positive plan consists in constructing the apparatus in such a way that the force acts intermittingly at will to any desired degree, and is not only manageable by the dentist, but also by the patient, who really is the best judge of the greatest degree of force that can be applied short of causing pain.

This intermittent principle of action may be approximately attained by the use of the old and well-known wooden wedge, pegs set in a plate, metallic fingers occasionally bent, or by the inclined plane, but generally better and more accurately than all, by the use of screws.

Although various means have for a long time been in vogue for moving teeth, there was no classification attempted, so far as I know, until it grew out of an inquiry into the behaviour of tissue-changes, involving a long series of original experiments during the processes of regulating teeth, which led to that which appeared to me to be a possibility of moving teeth sufficiently within the domain of physiological action (both progressive and retrogressive), to attain the highest possibilities with little or no pain,—a theory which years of subsequent experimental practice has now fully established to be the most scientific yet known*

Tissue changes in the sockets requisite to movements of teeth are not "necessarily pathological," as has been supposed. While pain and exhaustion caused by it is clearly indicative

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*The result of these experiments by me was made known to several professional gentlemen in 1873, in a paper which, in February, 1874, was used as a thesis at my graduation at Jefferson Medical College, Philadelphia, and afterwards read before the Brooklyn Dental Society, April 12th, 1875; published in the *Dental Cosmos* for January, 1876, and subsequently further elaborated in numerous papers in the same journal.

of perverted physiological action, the unconscious straggling of a tooth from proper position, or even the drifting of a tooth by improper antagonism with its mate or from overcrowding by adjacent teeth, when accompanied with no pain or inflammation, are equally clear evidences that the tissue-changes have been carried on within the domain of physiological or normal conditions.

If the double process of retrogressive metamorphosis and absorption and formation of new tissue,—the necessary tissue acts before and behind a migrating tooth by art,—if kept within certain limits, is painless, and if pain is the result of perverted physiologicol action, whether caused by continued force or by too great a degree of intermittent force, it logically follows that notwithstanding circumstances of some cases may justify it at certain periods in some operations that are very difficult, or even where economy of time or expense is a matter of consideration, it cannot be denied that to the extent that pain is avoidable it is a violation of the law of harmony. This statement, however, is not intended and should not be considered to mean that pain or inflammation alone is evidence of malpractice.

If intermittent force of a definite degree, alternated with proper intervals of rest, will more generally attain the highest possibilities with the least pain and least annoyance to the patient, then the interests of humanity naturally suggest that as a general rule teeth should be regulated by this system whenever circumstances will permit.

To more clearly differentiate, I will reiterate in brief that, while the old plans of making regulating apparatus only recognised one thing as essential,—force, based upon the belief that "force is force," mattering not of what character; not even considering the almost necessary concomitant with such devices, filthiness, as worthy of consideration,—I claim that the character of force can govern the question of pain, and that the function of the tissues will always painlessly tolerate a proper degree of intermittent force if not too frequently repeated, and that any (cleanly) mechanical apparatus that can be controlled so as to attain these ends belongs to the positive plan of mechanics, and when based upon and operated with these physiological functions in view, constitutes the main principles of the system that I advocate.

PROSTHETIC DENTISTRY.*

By Dr. K. B. Davis, of Springfield, Ill.

This department of dental practice has not for many years received that attention which its importance demands. It is year by year apparently receiving less attention at the hands of those who are competent to elevate it to a higher plane. Various causes have combined to bring about this result. Among these may be mentioned the introduction of the various cheap bases, sectional gum teeth, and the false assumption that the operative department of practice is more refined and honourable,—that it alone is worthy the exercise of our highest faculties and aspirations in the pursuance of our profession, and that any mere mechanic, wholly unqualified by education in science and art, is deemed competent to practice the other.

To that very large and unfortunate class who are compelled to ask aid from this department of practice this is a subject of vast importance. We may proclaim to them the great benefits of conservative practice upon the teeth, but it has no interest for them. Their teeth have already been sacrificed to the forceps, and they are no longer interested in the so-called operative department of our profession. But they are deeply interested in the prosthetic department of practice, and will gladly hail any marked improvement that promises to restore to the oral cavity every function that was swept away with the loss of the natural dental organs.

The natural teeth perform five different functions:

First. They give form, beauty, and character to the face and mouth.

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* A paper read before Illinois State Dental Society.

Second. They give expression to the face in every presentment. The various mental conditions are clearly set forth, and this is especially true of the emotions and the stronger operations of the mind.

Third. Speech. They control the voice and aid enunciation.

Fourth. They facilitate the use of the soft parts, and serve to retain them in their normal relations.

Fifth. Mastication. The welfare of the entire system is in a great measure dependent upon this function of the teeth.

In contemplation of these various functions of the natural teeth, what is the duty of the dentist when these organs are lost? It is certainly the duty of every practitioner to as faithfully restore all of the above-mentioned functions as lie within the power of art, science and experience. Our best efforts in this direction will often fail to accomplish a full restoration of all these functions, but, when the aim is a sorry attempt at the restoration of only one or two of them, at the same time entirely overlooking or sadly perverting all the others, is it any wonder that a total failure is frequently the result? We often see artificial teeth that serve the purposes of mastication in a remarkable degree, yet are lacking in every element that goes to restore the natural expression, symmetry, beauty, and the characteristics of the individual.

"In no department of dental practice does the want of that taste which indicates artistic culture become so manifest as in the failure to restore the natural expression by the replacement of lost dental organs. It is undoubtedly true that a large majority of the profession engaged in this branch of practice have given more thought and effort to the best methods of restoring the functions of mastication and speech, giving comfort, usefulness and durability in the use of artificial dentures, than to the equally important question of correlation of the substitutes with the general characteristics of the patient. To this account are to be charged the unseemly incongruities constantly staring every observer in the face from mouths whose lost organs have been replaced in disregard of this universal law. No matter how anatomically correct or how skillfully adapted for speech and mastication an artificial denture may be, yet if it bear not the relation demanded by age, temperament, and facial contour, it cannot be otherwise than that its artificial character will be apparent to every beholder.

"So, not to multiply examples, the dullest observer learns intuitively the demands of this great law of correlation. The artist's success depends upon the extent of his perception of it. The botanist esteems it a guide post in his investigations. The comparative anatomist regards it as a fundamental principle. The scientist in every direction of research knows its importance. Its full recognition by the dentist determines his status as an artist, and distinguishes him from the mere mechanic.

"A broad, square face, or an oval one; a delicately organised woman, a miss of eighteen, or a matron of fifty; a brunette or a blonde,—these and other varieties present as many different types, with teeth in size, shape, colour, density, etc., corresponding. If, then, teeth correlated in their characteristics to those which nature assigns to one class be in the mouth of one whose physical organization demands a different order, the effect cannot be otherwise than displeasing to the eye, whether the observer be skilled in perception or intuitively recognises inharmony without understanding the cause. A careful observation and record of these distinguishing characteristics—correlations—would go far towards establishing Prosthetic Dentistry as an exact science. There is as rich a field thus opened, and as worthy of culture and development, as any in the operative department of practice; an opportnnity as promising as that which incites others to perfection in structural prosthetics, and a reward in professional status and pecuniary remuneration not less deserved than that which is accorded to superiority in any other branch of practice."

In every public assembly, on the street, in the drawing-room, or wherever we may turn, we see such a display of these disgraceful productions of dental mechanics that it is becoming a reproach to the dental profession.

Let us now consider some of the methods that should be adopted to remedy the existing evils in this department of our practice.

There are no new methods worthy of mention in the construction of plates, but if those long in use are only properly directed and developed in accordance with the above-mentioned requisites for the restoration of the natural characteristics of each individual patient, what a wonderful transformation would soon occur in prosthetic practice!

How can this much desired result be secured? It can only be brought about by an abandonment of the present methods of the almost universal use of cheap vegetable bases and sectional gum teeth. This is certainly obvious to every practitioner. There is great variety in the shape, colour, size and arrangement of the natural teeth. Artificial substitutes should be made to resemble the natural teeth so closely in every particular as to prevent their detection by any observer. Can they be thus made? To do this we must abandon the use of sectional gum blocks, and in all cases resort to the use of single plain teeth.

(*To be concluded.*)

THE TREATMENT OF PULPLESS TEETH.*

By Professor Frank Abbott.

Mr. President and Gentlemen: I hope you will kindly pardon the very short paper I have to present to you this evening. It has been almost impossible for me to get time even to prepare the one I have, short as it is. I do not know however, but that it will be best to present it just as it is. It is simply a practical paper, and nothing but that,—no elaboration one way or the other, but a straightforward description of my way of treating cases of this kind that come to me.

There are probably no operations which the practitioner of dental surgery is called upon to perform attended with more anxiety and uncertainty on his part, and in the successful per-

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*A paper read before the First District Dental Society, State of New York, and reported in the *Dental Cosmos*.

formance of which more knowledge of pathology and the action of remedies is requisite, than in treatment of "dead" or pulpless teeth.

Every dentist has more or less individuality, or rather his own particular ideas as to the proper treatment of such as well as all other cases coming under his care; consequently this paper will deal with my own methods of managing such teeth rather than make any attempt to go over the field as cultivated by others.

I propose, therefore, to consider the subject under four distinct headings, in order to make myself clearly understood, and to do so as briefly as I am able, as follows:

1. The treatment of pulpless deciduous teeth.
2. The treatment of pulpless permanent teeth.
3. The treatment of teeth where the pulp is still living in one or more canals and dead in others.
4. The treatment of teeth with alveolar abscess.

The treatment of pulpless deciduous teeth is, as a rule, not altogether a satisfactory operation, from the fact that, by the time the teeth of children have decayed to the extent that the pulps have become exposed and died, more or less of the root or roots of such teeth has been removed by absorption. The death of the pulp, as is well known, puts a stop at once to this physiological process, and in consequence the rough, jagged ends of the partially absorbed roots remain as a constant irritant. Of this particular condition I shall have more to say further on.

The first step in the treatment of these, as in all other pulpless teeth, is to cleanse them as thoroughly as possible of all the dead and putrefying pulp substance. This may be done with broaches, a little cotton-wool, together with warm salt water, alcohol, a weak solution of carbolic acid and water, or any fluid substance of a non-irritating nature and slightly antiseptic, most convenient to the operator. After this is done satisfactorily, if a deodorizer is required, a solution of permanganate of potash, three grains to an ounce of water, will be found of service in dispelling any unpleasant odour, and at the same time serve as somewhat of a disinfectant. Then a sufficiently strong disinfectant, to destroy germ-life, is forced into the canals either with a fine syringe or the spray instrument (the latter is preferable). A small hole, about the thirty-second of an inch in diameter, is drilled through the side of the tooth, just under the margin of the gum, into the pulp-chamber. This differs from rhizodontrypi, in that the pulp-chamber and canals are cleansed. A cap of metal (I usually use thin platinum) is then placed into the bottom of the cavity, and, to be sure that the whole in the side of the tooth communicates directly with the pulp-chamber and canals, a small instrument is carried through the hole and into the pulp-chamber, and kept there until the metal cap is securely fixed in such a position that this communication is not subsequently interfered with. Upon this metal cap the filling is then placed, and the instrument withdrawn from the side of the tooth.

It will be observed from the foregoing that I leave the pulp-canals and a portion, at least, of the pulp-chamber not filled, but open and in direct communication with the mouth. This is done for the reason that in any attempt to fill such canals a portion of the filling material is liable to be carried through the foraminal opening, which is very much larger than normal before absorption had commenced. Again, the rough, jagged ends of the partially absorbed roots, directly in contact with the embryonic tissue (the remains of absorbed roots of temporary teeth) keeps up such a constant irritation that more or less exudation of serum is constantly taking place. If the pulp-canals under these circumstances are stopped up, thereby cutting off its exit, an abscess will inevitably result, while, with them open and free exit through the side of the tooth for such exudation, it seldom if ever occurs. This treatment, of course, is open to criticism, inasmuch as it invites, so to speak, a discharge through the canals, pulp-chamber, and side of the tooth into the mouth ; but the answer is, it saves a sore, painful abscess, and the discharge is kept at its minimum. The entire canal may occasionally be quite thoroughly cleansed by the use of a weak solution of listerine, or carbolic acid, with a Farrar syringe.

Pulpless permanent teeth, as far as cleansing and the use of deodorizers, antiseptics, etc., are concerned, are treated in the same manner as deciduous teeth, with the one difference that many pulp-canals of these teeth are so contracted and tortuous that they cannot be as thoroughly cleansed ; the removal of all the dead and putrefying pulp substances being more than ordinary mortals can accomplish.

It is of course unnecessary to designate to so intelligent a body of practitioners as this what particular teeth, or roots of teeth, are beyond perfect exploration. Suffice it to say, that in many teeth, after the most careful and thorough cleansing possible, a great portion of dead pulp still remains ; and successful treatment depends in a great measure upon the condition, whether septic or aseptic, of that portion remaining.

I know very well that my teaching does not accord with that of some gentlemen in this society, in that I do not use nor recommend the use of drills in pulp-canals for the more thorough (as they claim) cleansing of such canals, and the "breaking up of the nest of putrefactive organisms at the ends of roots." Years ago, when I had had less experience, I tried it, and learned a lesson which I have never forgotten and think I never will. I have here two valuable specimens showing this kind of work,—one of them from the hands of an expert at this manner of treatment ; one a lateral incisor, the other a first molar, both upper, the conditions of which here presented I think are a sufficient warning to all dentists to keep drills out of pulp-canals, particularly for the purposes above enumerated. Each of these teeth, or, I should say, the bungling work done upon them, produced a fearful and most uncompromising abscess, which was relieved in each case only by the removal of the tooth.

After the cleansing is as thoroughly done as the conditions altogether will admit of, an antiseptic, such as listerine, a solution of bichloride of mercury (one to two thousand), or a solution of carbolic acid, is thrown into the canals with the spray instrument : then a pellet of cotton-wool saturated with the remedy is placed in the cavity, and it is then sealed up with gutta-percha and wax, to remain one or two days, when it is removed, and the spraying and general antiseptic treatment repeated. This is done three or four times, at intervals of from one to three days, when, if no pain or soreness of the periosteum (pericementum) is present, the filling is completed in the following manner :

First, a very small bit of cotton-wool is carried to the end of the pulp-canal, and there packed tightly. This is to prevent the forcing of the filling material proper through the foramen ; the remainder of the canal is then filled with oxychloride of zinc, mixed to about the consistence of cream.

To facilitate this part of the operation, a few fibres of cotton-wool are used as a vehicle for carrying the oxychloride more readily to the location desired. The crown cavity is then filled. This disposes of the operation, provided the tooth has but one root and one pulp-canal, and that easy of access. If, on the other hand, the tooth under treatment has two or more roots or canals, and one or more of the canals is unexplorable, the case is treated as follows : After having filled, as above described, all accessible canals, a pellet of cotton-wool of a size to pass loosely into the pulp-chamber ; then a piece of gutta percha, large enough to a little more than fill that portion of the cavity, is warmed and gently but firmly pressed into the cavity. By this means the oxychloride held in the cotton-wool is forced into the minutest opening. Should the slighest pain be produced by this proceeding, the pressure should be stopped at once, when in a few minutes the pain will subside. The gutta-percha and pellet of cotton are then removed, and the crown filling completed with any material desired.

In teeth of more than one root it not infrequently happens that the pulp is found still alive in one or more of them, while in others it is dead. In the treatment of such cases the first step taken is to endeavour to save the live portions. In order to do this an application of creasote is made—after the pulp-chamber has been well opened and cleansed, and as much of the dead pulp removed from the other canals as can be conveniently—and the cavity sealed up with gutta-percha and wax. This may remain two or three days, when it is removed, and if the live pulp is intact carefully cap it with oxyphosphate. After this capping becomes sufficiently hard to admit of the further treatment and filling of the open canal, it is done in the manner previously described.

In case an abscess has developed and is discharging through the gum, the treatment is somewhat different, except as to cleansing, the deodorizers, antiseptics, etc. After cleansing has been satisfactorily accomplished and these remedies are forced into and through the abscess, a solution of chloride of zinc (forty grains to an ounce of water) is forced through the canals and abscess, until it is seen coming out of the fistula. The canals are then filled with the same material and in the same manner as before described, except that the bit of cotton-wool to stop the foramen is left out. The operation is at once finished. The objects of doing this at the one sitting are: first, a thorough antiseptic cleansing has been accomplished; secondly, the the escharotic effect of the chloride of zinc entirely destroys the pyogenic membrane which forms the sac or walls of the abscess proper, which with the pus produced by the excessive local inflammatory condition, discharges through the opening in the gum, and reparative granulation in a few days begins; thirdly, any subsequent work upon the tooth might result in pericementitis and a re-formation of the abscess.

In every case, after the operation upon these several classes of teeth (except children's) has been finished, the gum over the roots is "painted" thoroughly with the mixture, equal parts, of the saturated tincture of aconite root and tincture of iodine. Should any subsequent pericemental irritation occur, which manifests itself to the patients by slight soreness in biting, one or two applications of the aconite and iodine to the gum will invariably relieve it, unless the case has been allowed to go on until suppuration has taken place. Even then relief is sometimes obtained by its use. If, however, this fails, it may in very many instances be obtained by the application of the old-fashioned remedy, a hot raisin, prepared and used as follows: First, taking care to select a good fat one, open or split in two, and remove the seeds; then dip it into water as hot as the patient can bear, and at once apply it to the gum over the tooth. This is repeated every half-hour for four or five hours, leaving one in position upon retiring at night. The relief following this treatment is in some instances almost beyond comprehension. A painful swelling, half the size of a robin's-egg, is often entirely dispelled in twenty-four hours.

THE RELATIVE MERITS OF GOLD AND CEMENT AS A FILLING MATERIAL.

By C. W. Dunn, L.D.S., Eng., Florence.

Some two or three years ago it occurred to me that it might be interesting to write down a comparison between the merits of the different materials used for filling the teeth. I did so at the moment, and my notes were put aside and almost forgotten. However, a little while ago, I found them, and although so much time has elapsed since I wrote them, I think they are as true now as they were then.

Gold has for so long a time held such an important place in the estimation of the dentists, that they have communicated this idea to the mass of the public, and often we find that there is an unreasonable prejudice against any other material.

However, we are all aware that many dentists have awakened to the conviction that gold may be and is frequently used in cases in which another material would have answered the purpose better; and yet many apparently have not the courage to practise what they know they ought to do.

In the "Cosmos" some months ago, there was a complaint made by an American that an idea, in order to be accepted by American dentists, had to go over from Europe, and in Europe there is an impression that all ideas must come from America, and so the see-saw goes on perpetually.

It would be well could we get more independence of opinion and less fear of criticism.

Several years have passed since oxychloride of zinc and zinc phosphate cements have been introduced. At first there were great hopes that we had obtained that ideal filling which so long had been described; but, after a time, disappointment came upon us, and it was found that the durability of these preparations left much to be desired.

It cannot be said that any striking improvement has been made in their composition since their early introduction; but one thing about them has not, in my opinion, been sufficiently weighed and acted upon. It is, that although the cements do not last well when exposed to mastication and the full play of the saliva, it is altogether different when they are protected from both. When they have been covered over well by gold or amalgam, or enamel—when they have occupied only the inner, hidden part of the cavity, we find them, if after even years, in a hard, stony state; and should a thin layer of the cement have been exposed, the surface between the covering material and the edge of the cavity, it has not been worn away—as was remarked in the "Cosmos" number for the past month of April, by two members of the New York Odontological Society, in which they described their experience in the efficacy of a cement filling or fixing pivot teeth. They would have found the same result if they had looked for it in teeth which had been filled with cement, and covered over by a metallic or enamel surface.

I compared some of the quality of gold and of cement (zinc phosphate), and I hope that I have stated them fairly, and put them side by side, and commence with the advantages.

The Good Qualities of Gold.

It does not change its colour.
It does not stain the tooth.
It is capable of being made hard.
It is durable when the cavity is favourable
It has been tried and proved for a long time.
It satisfies the patient.
It has a good reputation.

The Good Qualities of Cement.

It does not change colour.
It does not stain the tooth.
It is hard.
It often lasts many years.
When the cavity is unfavourable it is a good filling material.
When the walls of the cavity are weak it strengthens them.
It adheres to the walls of the cavity.
It is easy to apply it.
It is a bad conductor of heat and cold.
Even when it wears away, its presence has been useful to the walls of the cavity.
It is not expensive.
Its colour more nearly approaches that of the tooth.

The Disadvantages of Gold.

It is difficult to insert.
It is troublesome and long to patient and operator to insert.
It is a good conductor of heat and cold.
If not well inserted, it is of little use.
In cases of weak walls of the cavity, it is the worst material with which to fill.
It does not adhere to the walls of the cavity.
When the teeth are of a poor quality, it is a bad, perhaps the very worst material to use. with which to try to save them.
Its colour is not good.
It is costly.

The Disadvantages of Cement.

Its durability is not so well established as that of gold.
It does not resist some buccal secretions.
It does not satisfy the patient sometimes.

In thus comparing the two fillings, it is but fair to remark that care should be given to cement fillings, as care is undoubtedly given to gold ones.

It is desirable to remember that the cement being more or less porous, requires to be well protected from the saliva as much as is possible. A solution of india-rubber spread over its surface protects it for some hours from contact with the saliva, or even oil or grease will be useful with which to smear over the surface, before removing the rubber dam or the napkin.

Again, I believe that it is very desirable that the cement should be put into the cavity in one mass if possible, and that after placing it there it should be left in a quiet state for several hours before touching it. After a day or two, when quite hard, it is easy to smooth the surface, and there is no fear of disturbing it; whereas if it be polished quickly after having inserted it, the setting might be interfered with, and probably would not be so perfect as if it were left at rest for some time.

WOMEN GRADUATES IN DENTISTRY.—The Pennsylvania College of Dental Surgery has graduated six ladies. Three are from Germany, one from Pennsylvania, one from New York, and one from the West Indies.

Reflections from the Surgery.

A CASE OF REFLEX PAIN.

Under the care of Professor Ladmore, D.D.S., L.D.S.I.

Mr. F. came to consult me on July 6th regarding a first right upper molar, which he informed me another dentist had failed to extract after three attempts. He told me he had been in agony for eight days and was unable to obtain sleep, he had become so worn out with suffering that I had to give him brandy to prevent him fainting in the operating chair. He came with the intention of having the tooth extracted but before doing so I made an examination, and although I found two small cavities I at once said I did not believe that tooth was the cause of the mischief and I must look further for something more definite, he, however, seemed to think this useless as he was certain the pain was in that tooth, I then looked at his lower teeth and discovered that the first and second molar on the same side were both badly decayed, the former having the pulp exposed and evidently in a high state of inflammation. I then expressed an opinion that this was the offender and not the upper tooth. After applying an arsenic dressing I requested him to call again which he did two days later, and informed me he had experienced no pain after leaving the operating chair. Since then I have filled the tooth and the result is a complete cure. The patient was evidently surprised at the success and said how glad he was the other dentist was unable to extract the upper tooth.

Precious Metals used in Dental Manipulation.—The Director of the American mint reports the amount of gold and silver used in the arts and manufactures in the United States for 1883 to be: gold, about £3,000,000; silver, £1,111,100, making a total of £4,111,100. There was consumed for dental supplies: gold, £7,580; silver, £1,347, making a total of £8,927.

British Journal of Dental Science.

LONDON, AUGUST 15, 1886.

THE APPOINTMENT OF DENTAL SURGEONS FOR THE STATE SERVICE.

All who are familiar with the morbid conditions which follow, and are, as it were, intimately bound up with dental caries, will recognise the very wide range which such lesions dominate. "Take care of the teeth, the digestion will take care of itself," is not a far-fetched parody upon a very true original; and, further, it is one which commends itself, not only to the trained dentist, but also to every educated man. In spite, however, of the almost universal acceptation of the truth of our theory, we find absolutely no effort made "by those who know" to put its teachings into practice, and by precaution and timely doctoring, to avoid the train of untoward events sure to follow the neglect of Nature's admonitions.

We have before pointed out that our schools, our reformatories, our workhouses, and their infirmaries, are one and all left without any adequate supervision by a dentist. Here and there we hear of a dentist being appointed to look after a school, as was the case at Anerley; but it still remains a scandal to England that her vaunted common sense and love of doing things decently and in order, have not induced her to insist upon a general rather than an exceptional appointment of a dentist to her schools. Nor can the evil be said to stop at the non-appointment of properly qualified dentists to our schools; for we find that throughout all branches of our Army and Navy, the same callousness, the same short-sighted policy obtains. The State, with superlative grandeur, ignores that her belligerents of all arms of the service have such things as teeth, she expects the men to shift for themselves, and if they and the "doctor" cannot grapple with the toothache between them, why so much the worse for them. The wealthy classes of England would not dream of sending for a Physician or Surgeon to minister to their teeth's necessities, and yet they are only too ready to assume that the army and navy are well set up when each ship has its surgeons, each regiment its medical staff. So long as the medical men of this country are absolutely ignorant of the diseases of teeth and their treatment, so long must they be held wholly unsuited to undertake dental work. The curriculum of an English medical student is quite outside dental work, and his experience of conservative or prophylactic dentistry *nil*. On all hands it is admitted that the medical student of today is already so overweighted with the burden of the subjects in which he has to satisfy the examiners that the cup of his bitterness is full to overflowing; and if he is asked to add even a smattering of knowledge about dentistry to his undigested and ill-assorted hodge-podge of anatomy, physiology, medicine and surgery, he will either refuse to enter so arduous a profession, or else graduate at Bedlam or Hanwell. It does not concern us at present to ask whether a slight knowledge of dentistry should not be incorporated in the usual medical courses. We have only to deal with the present state of the case, which is, we venture to affirm, that medical men are, as a rule, wholly disqualified by lack of knowledge, from undertaking the care of the teeth of groups of persons, whether in schools, on board ships, or in a regiment. It becomes then a grave question for the State to consider whether or no it will attempt to remedy the wrong which now reigns supreme throughout the forces, viz., that no adequate provision is made for the due examination, supervision and treatment of the teeth of the men, whether in the army or navy. The recognition of the necessity for the appointment of duly qualified dentists to serve the military and naval depots and infirmaries, must of course precede any attempt at settling the details of ways and means. Although at first sight various difficulties appear in the way of fiscal adjustments, yet we are confident these would all be capable of easy arrangement, were the questions once fairly tackled and brought within measurable distance of the national blue books. We shall not, upon the present occasion, attempt to do more than point out the obvious necessity of making a step in the direction of appointing a duly qualified man to the work of supervising dental cases, whether in the Army or Navy. In a subsequent article it is proposed to pass on the best means of accomplishing the end in view. So strongly do we feel the question is one of the first importance that we shall not be content until the pros and cons are most thoroughly threshed out, and the widest ventilation given to it. If not to-day, at least before so very long we venture to believe this matter will force itself upon unwilling official ears; and if tardily, at least will it effectually compel the attention in high places which its importance demands.

EPULOIDAL GROWTHS IN PREGNANT WOMEN.—Professor Garretson has drawn attention to the fact that fungoidal growths of the nature of an epulis are very liable to occur in the *enceintes*. These growths, although incessant in character, yet frequently increase so rapidly in bulk that their removal becomes necessary. If left untouched, Prof. Garretson affirms they will disappear of themselves after parturition. When pedunculated and requiring removal, he cuts off at the pedicle and cauterises the base.

"A DENTIST SHOULD HAVE CLEAN WHITE HANDS."—The following hints will be found of service, and accomplishing the desired end :—A little ammonia or borax added to the water you wash your hands with, and that water just lukewarm, will keep the skin clean and soft. A little oatmeal mixed with the water will whiten the hands. Many people use glycerine on their hands when they go to bed, wearing gloves to keep the bedding clean; but glycerine does not agree with every one. It makes some skins harsh and red. These people should rub their hands with dry oatmeal, and wear gloves in bed. The best preparation for the hands at night is white of egg, with a grain of alum dissolved in it.

White of egg, barley flour, and honey, is a good application, but not better than oatmeal. The roughest and hardest hands can be made soft and white in a month's time by doctoring them a little at bed-time, and all that is required is a nail-brush, a bottle of ammonia, a box of powdered borax, and a little fine white sand to rub the stains off, or a cut of lemon, which will do even better, for the acid of the lemon will clean anything.

A Plea for Rational Nomenclature.—It appears to us, says an Exchange, that it is about time our dental Bible should be revised, and such terms as "six-year molar," etc., should be abolished, and a proper nomenclature established that will be equally definitive and scientific, *i.e.*, according to Hoyle. One of the most absurd terms in use, constant at that, is, "artificial plate." Who ever heard of a natural one?

Carbon Bisulphide in Neuralgia. — Guerden, quoted by the *Southern Dental Journal*, recommends, as far superior to the menthol pencil in neuralgia, the application, for three minutes, of—

Carbon bisulphide (rectified) . . .	9 parts.
Essence of mint	1 part.

Shake well.

In superficial neuralgias, whether facial, dental, or intercostal, and in superficial rheumatic pains, this application produces instantaneous relief, and not unfrequently a cure. In the deep neuralgias, as sciatica, it is necessary to project the solution upon the painful part by means of an atomizer. Actual freezing of the skin is unnecessary. Dental neuralgia usually succumbs to this treatment applied to the corresponding cheek—a slight application to gum, or the insertion into the carious tooth of a pledget of cotten moistened with the solution being occasionally advisable. Very obstinate facial, dental, and pharyngeal neuralgias may be subdued by gently introducing into the external auditory meatus a pledget thus moistened, squeezed out, and covered by a layer of dry cotton.

ACTION FOR DAMAGES AGAINST A DENTIST.—An action has been instituted in America against a dentist for alleged unskilful administration of nitrous oxide gas. The plaintiff, a lady, alleged she has suffered great sickness and discomfort owing to careless and wrongful administration of the gas. The damages claimed were two thousand pounds. Another reason for always having a third person in the room when an anæsthetic is being administered.

DENTAL FACETIOUSNESS.—In the *Dental Register*, "where good things do abound," we find the following:—A Professor upon asking "which teeth come last," received the naïve reply, "The false ones." Another of the same sort is not, we believe, due to "Salmagundi." It runs: The Professor of Anatomy, in one of the medical colleges of this city, recently asked a student what the sphenoid bone articulated with. He was answered: "With all the bones of the head except the coccyx, and in some rare instances with that."

OPINIONS OF THE AMERICAN PRESS UPON THE INTERNATIONAL MEDICAL (DENTAL) CONGRESS.—The *New York Medical Record* says:—"The organisation and management are definitely settled, and we have no desire now to hamper its future work. We do not think that hereafter the International Medical Congress will meet with any aggressive opposition or criticism. Its managers have chosen their course, and we shall be glad, for the sake of our country's reputation, to see them successful in it." In another paragraph, the same editor says: "Still, we say to foreign delegates, you will meet a large number of able and hospitable gentlemen at the Congress, you will be made warmly welcome by all Americans, and you will hear no quarrelling while you are in the States."

The *Journal of the American Medical Association* adds: Kindly sentiments and assurances of future peace, even though late in finding expression, are none the less welcome. And if the Executive Committee of the Congress is to be permitted to carry forward its responsible work without further opposition, "our country's reputation" will be abundantly vindicated by the results.

OLIVE OIL AS A MENSTRUUM FOR COCAINE.—The *Medical Summary* tells us that Dr. Andrews, of New York, at the recent meeting of the American Ophthalmological Society, said that the plan of dissolving cocaine in oil seemed to insure longer contact of the remedy, and that a smaller quantity was required. But as the cocaine salts were not soluble in olive oil, the alkaloid was preferable, only requiring a few minutes of gentle heating in a water-bath to dissolve it.

IT IS ESTIMATED that cocoa is used by 10,000,000 of the human race; betel nut by 100,000,000; chickory by 40,000,000; coffee by 100,000,000; hashish is eaten or smoked by 300,000,000; opium by 400,000.000; 500,000,000 use tea, and all the known people of the earth use tobacco. The desire for some drug that has a specific action in the modification of nervous force seems universal, and before it is eliminated man must be re-created.

Abstracts of British & Foreign Journals.

OHIO STATE JOURNAL OF DENTAL SCIENCE.

TREATMENT OF PULPLESS TEETH.

By A. G. ROSE, D.D.S., Cincinnati.

Pulpless teeth are found in four conditions. In the first place, when the pulp dies without symptoms save the darkening of the teeth. The dentist, here usually makes the discovery and tells his patient. The thorough use of the disinfectants or germicides gives good results in treatment of this condition. Sanitas oil, eugenol oil, peroxide of hydrogen, bichloride of mercury, carbolic acid and iodine equal parts, salicylic acid, iodoform, creosote, carbonate of soda, tannin are given as remedies. In these cases he prefers to give rest and gentle treatment with complete removal of all disintegrated pulp tissue, and thorough disinfection. Unless dead pulp tissue be removed and phosphureted hydrogen gases are given off and escape through the foramen, particularly when the cavity of decay is closed, and irritation and inflammation of the tissues surrounding and adjacent to the end of the root result. This irritation may be incited, also by particles of the pulp, or any foreign matter which may be forced through the foramen during the cleansing of pulp chambers. Pericementitis thus becomes a condition we have to treat. The opening up of the pulp cavity or the removal of dressings, if treatment for disinfection is in progress, will generally give relief in a few hours. Depletion of the gum and removal of all calcareous deposits about the necks of the teeth and necrosed portion of the alveolar border will sometimes be only necessary. Equal parts aconite and iodine tincture applied to the gum of the affected tooth, a mixture of chloroform and tinct. of aconite is applied to the outside of the face using capsicum plaster, and continuing them for sometime after relief is obtained, will greatly assist in effecting a cure. In cases of pericementitis general treatment will sometimes be better than local applications. Anodynes, tonics, and carthatics, are to be used. Mouth washes, especially Phenol Sodique and Listerine, should be employed. A sac is usually formed at the end of the root of the tooth as a result of pericementis. If the sac is composed of dense fibrous connective tissue its inner surface is not smooth, but has irregular protusions or papillary outgrowths of a myxomatous structure. This is the third condition. Pulpless teeth with an abscess, without an external opening. It is often advisable under the circumstances to drill through the apical foramen in the pulp chamber, and the gas escapes through the apical foramen, so long may the production of pus corpuscles continue. There are two methods for the treatment of this stage. Injecting the disinfectant through the root and into the saccule by means of a finely pointed syringe, and carrying a piece of floss silk or cotton saturated with the remedy, into the canal and through the foramen with a broach. The chloride of zinc can be used to advantage in this latter way, and solutions of carbolic acid, bichloride of mercury, peroxide of hydrogen, nitrate of silver. When the application is made by means of placing pieces of silk or cotton in the root canal, and the medicinal effect of the remedy desired for a few days, it is best to seal the cavity of decay with a preparation of gutta-percha and wax, or some good temporary stopping. Pulpless teeth with an abscess, and a fistulous opening. Removing all disintegrated pulp tissue, enlarging the pulp canal and fistulous opening, force an escharotic or disinfectant through the apical foramen into the sac and the fistulous opening if possible. In bad cases of chronic abscess enlarge the fistulous opening, and with a bur or abscess knife cut away all necrosed alveolus saccule and portions of tooth substance, if necrosed. The opening upon the "gum" must not be allowed to close before the healing of tissue has taken place.

SOUTHERN DENTAL JOURNAL.

MORE REMINISCENCES.

By E. M. Allen, Marietta, Sa.

The writer cites cases showing how little knowledge many "M.D's" have of dentistry and oral affections.

A friend called to see him. He observed there was a discharge from a fistula half an inch long, opposite a superior molar, and asked if he had a troublesome tooth. The reply was there was no pain, but a constant discharge, which was very annoying ; he recollected he did have a very sore tooth a year or more previously. The tooth had a very large filling of tin, which had been there several years. He said he had consulted several physicians, but neither gave him any satisfaction. One called it an ulcer, but did not prescribe any treatment. Another one thought he must have received a blow which had fractured the cheek-bone ; while a third *knew* it was *cancer*—and he was also sure that he could never cure it; but as he had tubercular consumption, (which was true,) "it would strike to his lungs and hasten his death!" The tooth was removed and the salivary glands found to be so much implicated that saliva flowed through the fistula, instead of the natural channel into the mouth. By suitable treatment, this was corrected.

At another time, a patient appeared with a woe-begone face tied up in a napkin, and she had been under medical treatment for four months for neuralgia. A diseased tooth was soon found and removed, and the case did well.

Another M.D. once asked Mr. Allen to go with him and extract several teeth for a poor patient for whom he had an operation to perform, which couldn't be done until these teeth were extracted. He found a case of extensive necrosis of alveolus and teeth in inferior maxilla. Eight or ten teeth were removed and the only "operation" that the doctor "performed," was the introduction of a stick of nitrate silver into the sockets.

CELLULOID—ITS DEFENCE.

By D. D. Lester, D.D.S., Christiansburg, Va.

Celluloid is accused of warping, scaling and breaking. The writer believes these charges are made by those ignorant of its working qualities, or unskilled in its manipulation.

Warping he thinks is rare.

Scaling up, and consequent roughening of the celluloid, will often occur, if it is scraped, sand-papered and polished after being heated; but if made on a tin model and against a foil-lined matrix, which leaves a hardened and nicely finished surface this does not occur.

Breakage is far less frequent than with rubber. The material is fully three times as strong, and possesses many advantages over rubber. The most important, is the freedom allowed in arranging the teeth, enabling the dentist to secure more accurate articulation, and also to give individuality to each denture. If the alveolar ridge is prominent in front, the labial portion of the plate can be made thin, and the teeth placed under the ridge, so as to be natural-looking, where gum backs and rubber would be unsightly. It is free from the poisoning qualities of red rubber, and is less apt to cause sore mouth.

BRITISH MEDICAL JOURNAL.

ON THE EFFECTS OF DENTAL DISEASE,

By C. Gaine, M.R.C.S.

Mr.Gaine announced that his aim, throughout the address, would be to direct the attention of the various practitioners to some morbid lesions and important reflex phenomena, which were not unfrequently observed in the daily practice of medical men, and to point out to them where a properly educated practitioner of dental surgery might be of use in aiding the diagnosis of some forms of disease, which were more familiar in the course of daily work to a specialist than they could be to a general practitioner. When we thought of the wide ramifications of the fifth nerve, the distribution of which Mr. Gaine briefly described, it did not surprise us that local irritation of one set of its branches should cause widespread physiological phenomena. The fifth communicated with all the cranial nerves except, apparently, the olfactory, and it might yet be discovered that the trigeminal was, in some manner connected with the first pair.

The communications of the fifth nerve with the vagus through the tonsillar branches of the glosso-pharyngeal, which united with the palatine nerve (branches of Meckel' sganglion) were well known. Through this slender medium of communication, the only one yet made out, we frequently noted severe toothache where no caries, or other symptoms of inflammation, could be detected, through stomach-derangement, which a purgative would frequently relieve, and, on the other hand, gastric disturbance from the different forms o toothache, which relief of the local cause would surely cure.

Many varieties of neuralgia affecting different nerves and nerve-centres had been described, but very little was definitely known about the primary origin of any of them when the pain was of an idiopathic nature. Of the neuralgias described by different writers, but few were attributed to tooth-irritation, although many kinds had been relieved or cured by the removal of a diseased tooth or teeth. A few years since, an obstinate case of chorea in a child, eight years old, came under the lecturer's care, and was cured after the extraction of several deciduous teeth. The most common form of neuralgia affecting the fifth nerve was ticdouloureux, and this had been frequently cured by removing a tooth or teeth—either carious, or crowded, and impacted as to cause pressure on some nerve-filament, during the process of eruption ; the offending teeth, when not carious, could only be discovered by expert sounding or tapping with a steel instrument. The teeth were not frequently the cause of this distressing malady. It arose from a variety of causes, and was probably most frequent in women about the climacteric period ; and Mr. Gaine had not found a dental origin for hemicrania.

With regard to those cases where the teeth were primarily affected, either from overcrowding, caries, or congestion of the periodontal membrane, or from tardy eruption of the wisdom teeth, or necrosis of a tooth, or any part of the alveolar process or jaw, technical inquiry would rarely fail to detect the origin of the trouble, and prompt treatment might avert long and painful disease and invalidism. Early attention was always particularly necessary where a fault in the teeth was suspected, causing pain or stiffness in the jaw or surrounding structures, especially if near the time for the eruption of the wisdom teeth ; for trismus was apt to set in very rapidly, and any operation that might be necessary was easiest before the spasm of the jaw, with its full complement of teeth, had set in.

The lecturer then described a case of ptosis and amaurosis associated with fractured upper molar and pus in the antrum. Removal of the stump and evacuation of the pus was followed by dissappearance of the ptosis. Another case of neuralgia, trismus, and sinus below the lower jaw was caused by an unerupted wisdom tooth. The removal of that tooth, with the molar next to it, cured the patient. Mr. Gaine related a remarkable instance, where after a blow over the teeth, a lady suffered from paroxysms of pain darting through the head to the back of the ear and down to the shoulder. A lower second molar, which had lost its antagonist, was found to be tender on percussion, yet not carious. It was extracted, and the symptoms almost immediately disappeared. Mr. Gaine split the roots of the tooth, and found the dental canal of the posterior root almost obliterated. The pulp had, no doubt, been calcified some time ; and although the congestion of the periodontal membrane at the apex of the root was apparently slight, there could be no doubt that it was the cause of the mischief. This case showed how through the spinal origin of the fifth nerve, and its communication with the otic ganglion, a morbid impression could be conveyed to the brachial plexus and the ear. All the above cases showed the necessity of timely interference before sinuses had formed and burst through the integuments of the face.

Some observations were then made upon the chronic cachexia or septicæmia seen in persons who went about for years with carious but painless teeth in their heads, or with their teeth half buried in tartar. Such patients remained in a chronic state of invalidism, until the dental mischief was attended to. It was admitted that very serious diseases of the nervous system even epilepsy and tetanus, were sometimes traced to dental affections. Mr. Gaine then spoke of epulis, cleft palate, and epithelioma of the gums.

THE DENTAL LUMINARY.

THE AMALGAM QUESTION.

By J. HARDMAN, of Muscatine, Iowa.

The use of amalgam for a half century, attended during the time with marked improvements, fully vindicates its worth by the thousands of teeth saved and the warm gratitude of the possessors.

The making of a good alloy for filling teeth, is one requiring more skill, knowledge and care than is usually imagined.

There are three cardinal principles to govern in the making of a suitable alloy for dental amalgam.

1. Metals used should each have an affinity for mercury.
2. Those selected should be benign to tooth structure.
3. The quality of expansion of some metals, and of contraction of others while being made into amalgam must be so regulated that the combination will harmonise these extremes so as to form a non-shrinkable and a non-expansible compound.

Silver, tin, gold, copper, zinc, and some other metals readily unite with mercury, when they are in fine separation and some friction and pressure is used. And each of these formed into an amalgam has a characteristic of its own.

The first four named enter into nearly all the best alloys found in the market; while the two first form much the largest ingredients in any dental alloy.

Tin in excess will lack hardness; will have a tendency to "ball" and draw away from the walls of the cavity. Silver in excess will contract and tend to leakage. Gold in excess will interfere with crystalisation and strength. Copper, though invaluable in correcting contraction and securing the required edge-strength, if in excess, will cause too much discoloration. Of zinc a very little is enough; and if properly managed greatly aids in preventing discoloration.

Mr. Hardman cannot, from his experiments, find any good results from platinum in any quantity. Probably in most cases the use of platinum in alloy is the result of a supposed or imaginable good.

The mere combination of metals while in a fused state does not always secure the best results obtainable from a good formula.

If in a four metal alloy a division is made—two malts, and two ingots are made, each differing in quantities of its relative components, then cut separately, and afterwards the two alloy fillings intimately mixed; it will be found that its properties, when made into an amalgam, are very different from that made where all the metals of the same formula were melted into one ingot and so cut and used. This after mixture of two alloys, each differing from the other, but in the aggregate being a same selected formula, produces a different molecular result, and opens a field for further experiments and better results.

There is a strong tendency to use an amalgam that will not discolor in the mouth. In conspicuous positions, of course, this may be well enough; but without doubt a degree of discoloration (some formation of sulphide salts) is favourable to the teeth. This dark sulphide of silver and copper is an insoluble salt that has the mechanical effect of preventing leakage, and the therapeutic effect of promoting recalcification of partially diseased dentine. In teeth of young subjects, and where frail walls, and where it is difficult to make retaining points—where a portion of carious dentine should remain undisturbed over a pulp, &c., this strong variety of amalgam that darkens some, and has more silver than tin, and not less than 4 per cent. copper, will do a very lasting and efficient service.

It has been proposed to use gold in combination with amalgam; building the gold upon the amalgam immediately after packing the latter. In such work, the writer thinks, it is better to let the amalgam become thoroughly hard before adding the gold; retaining points, &c., may then be made in the amalgam and tooth walls conjointly. In this way the gold will (as is generally desired), retain a better colour, while all the benefit of compounding for the superiority of amalgam in cervical and frail marginal positions is as well secured. In compound cavities in bicuspids, and approximal cavities of cuspids and incisors, where the posterior or lingual borders are frail and must be freely cut away, this combination with gold and amalgam offers good and useful results, and makes clean artistic work, without losing unnecessarily tooth tissue, or endangering a nearly exposed pulp. To avoid darkening when gold has been worked into a fresh amalgam, the amalgam should be allowed first to harden before the gold is added.

For saving the deciduous teeth there is nothing in use that nearly equals amalgam. No difference what the age of the child, or to what condition of society belonging, it offers the most good, the least suffering and fatigue to the little patient and also to the operator. How frequently the caries is just approaching the pulp chamber, and the warning of a restless night brings the case forth. Now to simply remove the caries well from the borders, disinfect (with a little carbolic acid) that overlying the pulp and fill at once with amalgam, which can be done without the torture of the coffer dam; and even though the saliva may flow over the work while progressing, a very good protection will result.

In cases where temporary teeth are badly decayed in approximate surfaces, and from the short form of the teeth, and frailty of the walls, difficulty attends the securing of a separate filling for each tooth; a very good way is to extend an amalgam filling from cavity to cavity. This joining of the teeth in such cases does admirably, and where they are a little apart, a small bar of silver can be laid with an end resting in each cavity and upon some already introduced alloy, and thus anchored with amalgam, each aids the other ; and the bar has prevented the amalgam from being pressed unduly upon the intervening gums.

In the repair of a rubber or a celluloid plate, where a tooth or a block of teeth is to be restored, strong amalgam does it quickly and very completely. Grind and adjust the block, and directly beneath the pins cut holes and fissures with retaining walls. Fix the block in position by placing the edge of the gum border into a bed of warm gutta percha, taking care that it does not interfere with the retaining orifices. Now pack the holes, and space about the pins, completely with amalgam, and when hard dress up. If the amalgam is strong, and the case not put to use too soon, it will do excellent service. It is done quickly and saves the plate from the dangers and damage of reheating.

About testing amalgams the writer says:—

Every operator should test his alloy in regard to all the indispensable characteristics.

His experience will soon qualify him to judge as to its suitable rate of crystalisation. It may set too rapidly, or too slowly. The quality of strength can be tested with file, hammer, &c.

For expansion or contraction he should provide himself with small pieces (say half an inch in length) of glass test tubing. Fill some of these just as carefully as a cavity in a tooth. Place them in a solution of red aniline. If the amalgam will contract, then the leakage will appear and can readily be seen. If it expands the glass tube will crack. In either case the alloy is faulty. For color test, a button of amalgam with a polished surface may be dropped into a solution of sulphuret of pottassa (forty grains to the ounce of water will do) and let remain twenty-four to seventy-two hours.

As before stated the whitest alloys should not be selected where the most strength and durability is needed. An amalgam that will darken but little in the above named solution may in most mouths remain quite sightly, and especially for molars be a very good grade, so far as color is concerned, and the best for durability.

Whatever amalgam is used in the mouth, every step requires and deserves being done well and skilfully. Each filling should be well evened up and polished after it has become thoroughly hard, and the necessary instructions imparted to the patient to keep them in clean and polished condition.

Literary Notices and Selections.

A CRITICAL ESSAY ON THE DEVELOPMENT AND MINUTE ANATOMY OF THE TEETH IN HEALTH AND DISEASE.

By J. L. Williams, D.D.S., Philadelphia, Pa.

(*Continued from page* 719.)

As the germ of every human tooth springs from two distinct sources, it may be said to have two centres of origin,—the first arising in the epithelial layers, from which the enamel-organ is developed; the second from the underlying dermal tissue, from which the dentinal germ is developed. It may be well, at this point, to call attention to one of those errors of comparison to which I have referred. In a recent work on histology by a high authority the statement is made that teeth are developed in the same manner that hairs are. Other writers have asserted that the process of development in nails, claws, hair, and teeth is the same. Such statements show both a lack of close and careful observation and an absence of fine perception of what development means. They have simply glanced at the surface and seen certain similarities, and they go away and say the processes are the same. They seem not to know that if the processes by which a tooth is developed were the same as those that result in the formation of a hair, there would be in the end not a tooth, but a hair. There are important differences in the methods of development, and those differences are determined by the function or use which each organ or appendage is destined to perform. While from observation we can predicate nothing from the appearances of these centres of development at the commencement of the process, yet we may see, if our observation be carefully continued, that differences become more and more apparent at each succeeding stage, and we know that this is determined at the beginning.

It is not necessary for the purpose of this paper to go over all the ground of the evolution of the dental tissues. Permit me, then, to call your attention at once to this illustration of a developing tooth at the commencement of the process of calcification of the dentine and enamel. You see here the dentine and enamel pulps inclosed in a sac, in which these processes are taking place. This sac was for a time connected with the epithelium. This cord was simply an elongation of the primitive bud from which the enamel-organ is finally formed. After the developing tooth is completely inclosed in its sac this epithelial cord is broken up, and there is seen to result from its breaking up little whorls or globular masses of these epithelial corpuscles.

As there is a deeply interesting subject which may have some connection with this disappearance of the enamel-cord, you will permit a little digression here. You know we not infrequently find departures from the normal number of teeth in the mouth ; we find extra or supernumerary teeth, as they are called. We also sometimes find teeth developing in other parts of the body. I have here for your examination some specimens of quite perfectly formed teeth, which were taken from an ovarian cyst. The question at once arises in our minds. What antecedent conditions have led to the formation of these supernumerary teeth, whether in the mouth or in locations remote from their usual position? In the development of the second and third molars we observe that the germs from which they grow arise as buddings from the cord of the first molar germ ; the cord of the second molar arising from that of the first, and the third from the second. This has led to the conclusion that under certain conditions any portion of the epithelial cords of the tooth-germs may develop into an enamel-organ or pulp. We have also observed that a dentinal germ is always formed directly beneath the enamel-pulp wherever it drops down into the dermal tissue. It thus seems that the presence of the enamel-pulp is the immediate antecedent of the dentinal germ. This view is confirmed by the fact that in the formation of the teeth of some of the lower forms of life, in which the fully-developed tooth has no enamel, there is, at the commencement of the process of development, the correlative of what becomes the enamel-pulp of the teeth of higher organisms. This is very strong evidence that the presence and position of an enamel pulp determines the formatien of a tooth at that point. This is s beautiful illustration of the statement before made, that in the endeavour to unravel the complex relations existing in the higher organisms we are often greatly assisted by a study of the lower forms. Now, if any portion of the enamel-cord may develop into an enamel pulp, and if the enamel-pulp determines the formation of a tooth, then there is a reasonable probability that those little whorls or globular masses of epithelium which result from the breaking up of the enamel-cord may, under unusual conditions, result in the development of a tooth, and that these globular epithelial masses may be carried to remote parts of the body and there result in the formation of teeth. You may object that there are too many "ifs" and probabilities surrounding this question ; but I have only to reply that, in the absence of all positive knowledge, the highest probability stands as the next best thing, and the whole theory of evolution and many other modern scientific doctrines rest on a less secure foundation.

It is but proper to mention, however, that there is another theory for the formation of teeth in ovarian cysts, which is that in the formation of the embryo some portion of the epiblast in the region of the mouth becomes caught and infolded within the body cavity as the body walls close together. If we turn now to our illustration of a developing tooth, we observe that it is completely surrounded by a sac composed largely of spindel-shaped connective-tissue elements. We see that its vascular supply is concentrated at two points,—in the dentinal pulp and around the enamel organ ; and this is precisely what we should expect, for the one is the formative organ of the dentine, and the other of the enamel. It is seen that the formation of dentine begins at the line of its junction with the enamel, and proceeds inward and downward, and that the formation of enamel begins at the line of its union with the dentine and proceeds outward. I believe there are those who do not regard this as the manner in which these tissues are formed. But there is such unanimity of opinion among those who have done any considerable practical microscopical work in this direction that it is hardly worth while to discuss the point with those who would not care to be known as holding critical views on the development and histology of the teeth.

What is the process by which dentine and enamel are formed? We now approach the consideration of an important question, and the one upon which my criticism of well-known and popular writers upon the histology and pathology of the dental tissues is largely based. The formation of dentine begins shortly before that of enamel, and its first appearance is that of a cloudy, cartilaginous-looking line, which is seen just outside of the odontoblasts, occupying the most prominent point or points in the developing tooth. At the same time delicate fibrillæ are seen sprouting from the outer ends of the odontoblasts. As this line of forming dentine increases in thickness the odontoblasts are observed to always remain just beneath it. It is probable that the increase in thickness of the dentine is effected by the continued secretion of the cartilaginous matrix, which has been called calco-globin, and the almost simultaneous deposit of the mineral constituents in this matrix. The forming line of dentine is probably pushed upward and outward by the continued deposit from the odontoblasts. As the process approaches completion, the dentine is also increased in thickness fom within, thus reducing in size somewhat the pulp,—at least that portion which remains in the roots. The growth of the fibrillæ corresponds with the increase in the thickness of the dentine, although they sometimes seem not to be governed by this condition, but grow on and penetrate between the ameloblasts, which lie just outside of and in contact with the dentine. This penetration of the ameloblastic layer by the dentinal fibrillæ is probably always effected before the deposit of enamel begins. These dentinal fibrillæ sometimes continue to grow, their terminal points keeping just in advance of the outer line of forming enamel, so that when the enamel is completely formed its entire thickness is traversed by these fibres. This is not of common occurrence, but I think it can hardly be regarded as a departure from normality, for I have many times observed the dentinal fibrillæ penetrating the entire thickness of the enamel in the teeth of animals.

Every appearance of the formed dentine in health and disease, and every phase of its development, contra-indicates the view that it is built up by the calcification of layers of odontoblasts or dentine corpuscles. If this view were correct, we should everywhere see partially calcified corpuscles, which we never do. The line between the forming dentine and the outermost layer of the odontoblasts is always strongly and sharply marked. There is no other possible way of explaining the continuity of the dentinal fibrillæ, now that it is demonstrated beyond all possibility of doubt that they are offshoots or prolongations of the ontoblasts. The building up of the dentine by calcification of the successive layers of corpuscles was necessarily accompanied by the theory that the dentinal fibrillæ were offshoots of the reticulum of the pulp, which offshoots passed between the odontoblasts into the dentine. The demonstration of this error removed the only foundation upon which that whole theory rested. The most logically constructed theory becomes valueless when the premises upon which its first postulates rest are disproved. I know that many regard all scientific theories as matters of minor importance. But when we realise that the entire practice of medicine, involving as it does the great practical questions of human life and happiness, rests almost entirely upon theory, we see the importance of applying the most rigid tests to all assumed basal principles. Our practice must depend upon our perception of pathological conditions; and the clearness of our perception of these conditions grows out of our knowledge of structure and function, and this knowledge, we are growing more and more to see, rests largely upon the history of the unfolding or development of the organism. I do not wish to be understood as passing any criticism upon the teachings of the honourable gentlemen whose theories I am considering, except so far as they have relation to the development and histology of the teeth. I must regard these teachings as in many respects erroneous, and in other features as giving undue importance to and emphasizing certain points in the histology of the teeth which have long been familiar to practical microscopists in this field. It is a tendency not infrequently manifested by scientific workers in special directions to so magnify the importance of some particular aspect of the truth that it is distorted out of all relation to the many qualifying truths to which it is related. It has been assumed that because bone and cementum are formed by the calcification of globular territories, and because dentine bears some slight resemblance to bone and cementum, therefore it is built up in a similar manner. This is but another evidence of that hasty deduction from inadequate study of which I have already spoken. Many writers have laboured to draw the most absurd comparisons between bone and dentine. But dentine remains dentine just the same, and the difference in the completely developed tissues is the correlative of the difference in the methods of their development. In the development of bone, and to a considerable extent in cementum, the original osteoblast or cementoblast remains as the persistent center of the calcified territory, and the source from whence its continued integrity is maintained. Now, in dentine the only thing corresponding to this persistent center is the dentinal fibrillæ. But the dentinal fibrillæ are continuous processes running from the odontoblasts on the surface of the pulp through the entire thickness of the dentine to the enamel. Neither are they the center of what was once a larger territory occupied by the odontoblast, as I have shown when speaking of the growth of the fibrillæ. By a process of reasoning by exclusion, and by the evidences shown by the microscope, we reach the conclusion that the formation of dentine is effected by a process of continual deposit from the enamel inward, until the typal demands of each tooth are satisfied. One other fact, which in itself is sufficient to demonstrate the impregnability of this position, is the free branching of the fibrillæ at their terminal points, while in the deeper layers of the dentine and in the region of the pulp-canal it is far less marked, and in many cases there is almost an entire absence of this branching. There is one other feature of the histology of a developing tooth which, if carefully studied, will also demonstrate the impossibility of the theory under criticism. The odontoblasts, as before mentioned, are observed to send a varying number of fibers into the dentine, five or six of these fibers sometimes arising from a single corpuscle. These corpuscles or odontoblasts are also observed to be connected with the pulp reticulum by root processes arising from their inner ends, and these latter processes do not correspond in number with the dentinal processes arising from the same corpuscle. If the dentine were formed in the manner described by Dr. Hitzmann, there would be great irregularity in the direction and arrangement of the dentinal fibers; which is not true, the arrangement and continuity being, in normally developed teeth, uniform throughout the entire thickness of the dentine.

The enamel is formed from the ameloblasts. These bodies are derived from the Malpighian layer of the epithelium of the mucous membrane. They are the active secretory elements in the formation of enamel. I have in former papers pointed out the relationship existing between the enamel-organ and other glandular bodies derived from the epithelium. As before mentioned, and as beautifully shown in the drawing, there is a free supply of blood through an intricate capillary plexus surrounding the enamel-organ.

The precise part played by the reticulum or interior portion of the enamel-organ in the development of enamel has not yet been fully determined, but it is quite probable, as pointed out by Dr. Sudduth, that the presence of the reticulum of the enamel-organ is not necessary throughout the entire process of enamel formation, but rather that it is a matrix or receptacle in which is stored and partly elaborated the material for the commencement of this process. But the fact that we find, in sections of the persistent growing teeth of the Rodents, this same reticulum of the enamel-organ is a demonstration of its importance. In the formation of enamel the error of the teachings of Dr. Heitzmann is even more evident than it is in dentine. There is never to be seen but a single layer of the prismatic enamel-cells which surmount and surround the forming enamel. The line which separates the ameloblasts from the forming enamel is even more strongly marked than in dentine. There are, however, important differences between the formation of enamel and dentine. Transverse and longitudinal sections of enamel show that it is built up in the form of prismatic elements, which have a wavy and also in some locations—notably on the points of the cusps—a spiral arrangement. Now, we know that the functional activity of every corpuscle proceeds from its center outwards, the circumference being less highly endowed than the center. We have seen that the ameloblasts constantly recede outward before the line of advancing enamel-formation. We know that the enamel-rods, as a rule, are continuous throughout the entire thickness of the enamel, and that each enamel-rod is ensheathed in a substance differing in appearance from the rod itself. This covering of the enamel-rods is also the cement-substance which unites them.

It seems that as the ameloblasts recede or grow outward they leave behind, in the forming enamel, the intra-cellular cement-substance which forms the low-grade fixed material of which the external of every enamel-rod is formed, and this constitutes the matrix of the enamel into which the active functioning portion of the ameloblasts deposits the phosphate of lime and other mineral elements.

If the cell of the honey-bee were continuous throughout the entire thickness of the comb, and had that same wavy and twisted arrangement which the enamel prisms have, it would form a beautiful illustration of the structure of enamel; the waxy substance of which the walls of these cells are composed corresponding with the organic matrix or inter-prismatic cement-substance of the enamel, and into this organic matrix the ameloblasts deposit the mineral constituents, as bees deposit honey in the wax-cells of the comb. This view is confirmed by all the appearances of developing enamel, and necessitates no departure from the functional order of every morphological unit of which the body is composed. As the formation of the enamel-prisms proceeds outwards, and as these prisms are not perceptibly larger at the circumference than at the line of union with the dentine, we may see that, if there were only a limited and definite number of enamel-formers or corpuscles at the commencement of the process, as the enamel-cap is a modified sphere, there would be everywhere throughout its substance cone-shaped cavities. Extra or supplementary cells are therefore provided for the filling in of these widening spaces, and in longitudinal sections of enamel we may see where this process begins. These extra cells probably arise by division of the ameloblasts. But it should be remarked that this same appearance may be caused by the twisted enamel-rods coming into view just at the point where the section was cut. Many absurd blunders of interpretation arise from regarding the plane of the section as a complete picture of the entire structural arrangement. The enamel-organ is sometimes spoken of as having a stirrup-shape, from the appearance of a section, when it is, as a whole, an invaginated, modified cone or sphere. What Dr. Abbott has illustrated in Fig. 4 of his recent paper on the pathology of enamel as an abnormal, irregular arrangement of the enamel-prisms is due simply to the specimen having been cut through a territory where the forward direction of the enamel-rods or prisms was diverted by the spiral arrangement of which I have spoken. I have many times seen the same appearance in normally-developed teeth. In truth, this arrangement of the enamel-prisms is one calculated to give the greatest possible amount of strength, and is, as I have remarked, found at those points which must maintain the greatest resistance in mastication. We should therefore always expect to find such an arrangement in teeth of the highest organisation,—an anticipation which, I believe, careful observation will confirm. Neither can I regard the stratification or pigmentation of enamel, as elaborated in Dr. Abbott's recent paper, as a matter of much importance from a pathological stand-point, for these appearances are common in the teeth of animals in which caries is never found, so far as I am aware. As the formation of enamel approaches completion we find that the ameloblasts gradually disappear. We have observed, during the formation of enamel, a layer of flat cells lying just outside the ameloblasts. This layer of cells I believe to be hardened by direct calcification as Nasmyth's membrane. It is this layer of flat, calcified epithelial elements which gives the glossy, polished surface of perfectly-formed enamel. This layer has been supposed by some to be a continuation of the cement-forming organ. But this is a mistake. The cement-forming organ is a modification of the original tooth-sac, and, as this sac extends completely over the enamel, some portion of it may become infolded in the formation of the sulci of the teeth, and then be stimulated, perhaps by the supply of lime-salts, to the formation of cement territories in the depressions of the molars and bicuspids. But the calcified layer of cells forming Nasmyth's membrane, will never, I think, be found outside of these cement territories.

(*To be continued*).

Dental News.

ROYAL COLLEGE OF SURGEONS, EDINBURGH.—During the July sittings of the examiners the following gentlemen passed their final examination, and were admitted Licentiates in Dental Surgery :—Harry Graham Smith, Edinburgh ; Frank Gorden Allen, Derbyshire ; and James Taylor, Lancashire.

WORK DONE AT THE VICTORIA DENTAL HOSPITAL, MANCHESTER,

DURING THE MONTH OF JULY, 1886.

Number of Patients attended		959
Extractions	Children nnder 14	684
	Adults	
	Under Nitrous Oxide	34
Stoppings.—	Gold	40
	Other Stoppings	93
	Miscellaneous	298
	TOTAL	1149

HENRY L. KNOOP, Hon. Secretary.

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SOME NOTES UPON DISINFECTANTS AND GERMICIDES.—I.

By Dudley Wilmot Buxton, M.D.; B.S. Lond., M.R.C.P.; Assistant to the Professor of Medicine in University College, London; Administrator of Anæsthetics in University College Hospital, the London Dental, and other Hospitals.

The steady advances made in the field of bacteriological research have given especial interest to the members of the pharmacological groups termed Disinfectants and Germicides. The more accurate the conception which the mind receives of pathological processes, the more anxious does it become to search for, and, if possible, find some therapeutic means whereby such morbid departures may be stayed. Louis Pasteur's life has exemplified this in a striking manner; the marvellous insight which traced out the silkworm plague, at once saw a remedy; and so with splenic-fever, and we may hope also with hydrophobia. And hence it is that the more thorough knowledge which dental surgeons are gaining day by day of the life-history of the microzymes found in the mouth has led them to employ with greater assiduity agents which possess the power of disinfection. As the pharmacology of these agents is somewhat outside the run of most practitioners—whose time is too fully engrossed to permit of extensive reading—I may, perhaps, be pardoned for offering a few notes for their perusal.

Surgeons in general, and, of course, I include dentists—who are, or should be, surgeons first, and dentists afterwards—have been familiar with the use of disinfectant materials for a great while, but have in their employment followed rather an empirical than a rational method, believing the agents did good, but not caring much to inquire how. Lister's vigorous advocacy in this country succeeded in establishing a working hypothesis, and now we most of us have more or less crystallised ideas concerning germs and the methods in vogue whereby their fruition is checked. Briefly, we may say that there exist throughout the whole domain of matter, creatures infinitely tiny, which are of the nature of the most lowly vitalised matter, and these possess the power of propagating, of developing, and of establishing morbid conditions whenever they become placed under suitable conditions—are favourably environed. When I say they possess the *power* of propagating, I am using a term possibly liable to misconception. The unaltering laws constraining their existence compel their development to be accompanied by certain phenomena, phenomena which we recognise as constituting various diseases. Thus the inoculation with authrax spores must, if the authrax find itself in favourable conditions, give rise to the disease charbon. Therapeutic measures have then to be directed in one of the following ways: (1) To destroying the germ, and so preventing the procession of its development. (2) To rendering its activity harmless by antidoting its virus. But the many conditions grouped under the heading blood-poisoning are not at present known to be all due to organised germs, and hence, as Koch has pointed out, the value of disinfectants cannot be gauged solely by their germicidal powers. We have to deal with substances used as disinfectants which differ widely in their powers, and it will be best to discriminate carefully between the uses to which they are put, in order to arrive at a more just estimate of their value. Let us inquire first, what is a disinfectant? Dr. Buchanan Baxter offered the following definition. According to him, a disinfectant is a body fatal to the growth and multiplication of microzymes which accompany putrefaction. But it must be remembered that in estimating the power of any given agent we must take account: (1) Of its power of preventing putrefaction; (2) Of its power of stopping an already existent condition of putrefaction. Many agents capable of acting in the first case, fail utterly in the second. In applying remedial agents to check putrefaction in the mouth, we have very many complex problems to solve. Comparing the mouth with an open wound, we find it very much more difficult to deal with effectually. The wound can usually be dressed, and kept well under the control of the agent selected to prevent decomposition of its secretions, and there is but little danger of absorption of the disinfectant taking place, and so causing toxæmia. Of course, carboluria, mercurialisation and iodoform poisoning do occur as the result of dressing extensive wounds with carbolic acid, mercury, or iodoform, but these untoward results are not common when care is used, and the results are not, as a rule, serious. Now contrast what must follow were the perchloride of mercury, were iodoform to be used in the same heroic manner in dealing with oral perversions and wounds of the gums, or mucous membrane of the mouth. The agents used by dentists must, then, fulfil the same requirements as those employed in wound treatment, but must be used with the utmost caution, and only when an accurate knowledge of their toxic powers is possessed by the dentist. The uses to which disinfectants may be put will, in the hands of dentists, embrace the very important one of destroying morbific germs which are sure to cling to forceps, elevators, etc., unless specially disinfected; the treatment of wounds, such, for example, as made by extracting teeth, opening abscesses, etc.; the cleansing of putrid cavities, such as fistulæ or sinuses leading to dead bone, and antral abscesses. Again, disinfectants are used to antisepticise the mouth, to destroy putrefactive germs already in the mouth, and to anticipate putrefaction by creating a condition which is inimical to the development of germs. The large and important question of antiseptics, as used by dentists in preparing the cavities in teeth for stopping, filling, etc., has been omitted in the present paper. There are a number of bodies called deodorants, many of which, although largely used, because they obviate unpleasant odours, are yet quite valueless as destroyers of morbid germs, and hence it is most necessary to discard such if true disinfection is aimed at. In the face of this fact, it is rather unfortunate that the usual so-called disinfectant mouth-washes are made up rather to please the eye and palate, and to deodorise the breath, than to destroy the hordes of predatory microzymes which abound in the mouth and colonise the teeth. And here I may be allowed to draw attention to the great importance of systematic washing out of the mouth—an art seldom acquired, and still less frequently practised Mere rubbing of the teeth with powders, etc., by means of a brush, must always be supplemented by frequent and thorough mouth ablution, as this means is the only one which renders the mouth pure and clean. Many cases familiar enough to the physician arise, in which the natural disinfectant and lubricant of the mouth, the saliva, is either suppressed or perverted, and the hot, dry, reeking mouth then becomes pestilential to a degree. Mouth washing is in such especially valuable.

But before we pass on to the detailed consideration of the disinfectants, it may be well to point out some reasons which seem to emphasise the importance of the rigid use of disinfectants during dental operations. Extraction of teeth, when performed by forceps, may be transformed into a perforced inoculation. The soft parts about the tooth are severed by the cutting edge of the forceps, if I may be allowed the expression, and the blades of the forceps are rubbed to and fro upon the rawed surface of the gum for an appreciable time. Now, given that that pair of forceps has been employed upon a patient the subject of a disease communicable by blood or germs, the minutest speck upon the instrument will be enough to set the mischief a-going, and to produce, it may be, the most disastrous results. Mere washing in water, or a perfunctory dip in a solution of permanganate of potash, is not enough to obviate such untoward results. Indeed, the same strict system of instrument cleansing should be adopted in dental surgery as that promulgated by Lister for observance in general surgery, if dentists desire to remove the possibility of some day inoculating a patient with some pathogenic micro-parasite. Of course, the expediency or necessity for all these precautions must be decided by the dentists themselves; it is merely my function to draw attention to the methods most likely to destroy pathogenetic germs.

Among disinfectants we propose to consider :—

Carbolic acid and the carbolates.
Corrosive sublimate.
Iodine and its preparations.
The permanganates.
Resorcin.
Iodoform.
Bromine and its preparations.
Boric acid and borax.
Eucalyptol.
Sulphurous acid and the sulphites.
Chloride of zinc.
Oil of cloves.

Terebene.
Turpentine.
Salicylic acid and the salicylates.
Quinine.

"GASSING," "CHECKING" AND OTHER INCIDENTAL CONDITIONS OF CONTINUOUS GUM-WORK.

By Robert Marston, Leicester.

(*Continued from page* 727.)

Dr. Cunningham mentioned also, another change of the gum-body and enamel which he had observed, and for an explanation of which he applied to Dr. Ambler Tees; the result being that both gentlemen concurred in the opinion, that the preparations supplied to the profession varied in their quality from time to time, the complaint being, that the change was not from worse to better, but that it is from better to worse. It would certainly be interesting to know whether Dr. Ambler Tees admitted the unreliableness of his own preparations? Probably he did not. With all due respect to the authority quoted, I cannot help thinking, that if the depots stocked inferior porcelain at times, the universality of the complaints of known skilled manipulators, at those seasons, would have made it impossible for that fact to remain so long a mystery.

Undoubtedly the preparations do *alter*, and that, perhaps, is very well known to every dentist who uses them. Then how comes this change? Is it the effect of spontaneous decomposition? Oh no! We cannot suppose the possible decomposition of dental porcelain, which is not sensibly affected by long immersion in acids or alkalies at the ordinary temperatures of the atmosphere. The explanation of this change and its cause necessitates my remarking, that dental authors inform us the opacity of the earliest mineral teeth was owing to the kaolin which they contained, but whatever dental authors think about that, tooth makers know that a composition containing a large percentage of kaolin, and ground to an impalpable powder as described, would have yielded a product which could not have been tolerated in the mouth of any person. The semi-opacity of a well-made tooth is neither more nor less than an optical illusion ; just as much so as is the appearance of milk, or the foam of the ocean's billows, or the froth of pure soap-suds, or the appearance of an emulsion of transparent nut oil, and transparent alkaline solution.

The translucency of a mineral tooth is mainly governed by the number of minute transparent globules (bubbles) that it contains, which are determined by the size of the granules that compose the porcelain material, its translucency increasing or diminishing in proportion to the decrease or increase of the number of globules contained within a circumscribed volume of the vitrified mass; or, in other words, the coarseness or fineness of the ground material. That fact may be proved by an examination of the fracture and exterior of a mineral tooth, by a microscope of even moderate power. Now, if a vessel containing porcelain material be shaken, the porcelain particles rub and grind against each other, and become reduced in size, proportionately to the quantity of dust produced from each by that friction. The more this was repeated, the greater would be the quantity of impalpable powder, the behaviour of which, in the muffle, is detrimental to the translucency and colour of the porcelain. Every motion of the vessel occasions some degree of that agitation, and probably, the cumulative effect of oft-recurring violent molecular vibrations, when continued through a period of many months, would be surprising. But when the porcelain is contained in a vessel composed of papier-maché, paste-board, or other similar material, the organic matter inevitably detached therefrom by the mechanical action of the gritty particles, must, necessarily, become incorporated with the porcelain, and then the binary action of these two inherent evils will be quite sufficient to effect a remarkable change in the behaviour of the porcelain within the muffle, as well as in its ultimate appearance. Gum-body and gum-enamel should be stored in wide-mouthed stoppered glass bottles, or porcelain jars, closed with a lid of the same material. Before dismissing the present consideration, I may say, the fact of this theory may be demonstrated by grinding transparent glass to an impalpable powder, and afterwards baking it.

"Checking" is a phenomenon which, when it occurs in the continuous gum process, dentists distinguish by that name ; but when accidentally produced by the glass maker, or intentionally created by the chemist, is then called devitrification. The result of this tendency, when developed in the dental process, is a modification of the product, which terminates the chemical process; that is, the curiosity known as "Réaumers porcelain," the point of analogy being, not so much the ocular effect (for that may be diversified), as the identity of the act of their common obeyance to one law, and, in this respect, devitrified dental porcelain differs from "Réaumers porcelain" only in the effect of the extent to which the process has been conducted; "checking" being an early stage of de-vitrification. According to Dartigue's, Pelouze's, and Splittgerber's supposition, this change arises simply from the amorphous silicate passing, without change of composition, into a crystalline form, the long-continued state of softness affords the atoms an opportunity of uniting together in crystalline molecules. But Morveau, Lewis and Dumas suppose that the silicate, in undergoing this change, loses a portion of its alkali, which, if the silicate is heated by itself, passes off in vapour, and, when it is surrounded by a powder during ignition, is absorbed by the powder. Miller supposes the opacity caused by this change doubtless arises from the separation of fine particles, whose composition differs from that of the rest of the mass. Black would reconcile the theories of Dartigue, Dumas, and Miller, by maintaining that the compounds may result either from dissipation of alkaline matter, or from the separation of the mass into two strata, the most highly alkaline retaining its amorphous condition more persistently than the other more siliceous portion. Dartigue, Pelouze, and Splittgerber are obviously wrong, because the dissipation of the alkali is too apparent to escape observation; and Black's theory is purely speculative, because, if the composition remained unaltered, the silicate would then fuse again at its original fusion point, as its fusibility is governed by the proportion of alkali contained; whereas a higher temperature is necessitated for its fusion by every repetition of this change to which the silicate is subjected, until at last it becomes infusible at any attainable heat of ordinary furnaces. And as dissipation of the alkali always takes place, he is by that means deprived of any opportunity to demonstrate the fact of his theory, as it relates to the separation of two differently constituted silicates independent of the loss of alkali; and a theory which supposes that this change occurs spontaneously in obeyance to the natural law which governs chemical principles, independent of the loss of alkali, must also suppose that the supersilicate whose molecules assume a crystalline condition, thus separated and suspended in the more alkaline menstruum, is a definite and stable, true atomic compound; whereas practice proves that those silicates which, in the light of a knowledge of this law, are by analysis determined true atomic compounds, are more prone to undergo this change than those compounds which are formulated without deference to the aid of science. De-vitrification, more or less complete, determines the quality of dental porcelain, but to this end it has to be controlled by the modifying influence of skill, which, as the proceedings and their results were at the first undoubtedly accidental, could only have been acquired by the strict observance of the operation of that natural law which governs the formation of silicates. The rebutting force of nature, to remove the obstacles which man's incompetency had placed in the way of his own attempts at excellence, must have led the thoughtful observer, by degrees, to the climax of perfection, as judged from the standpoint of his requirement (if not to a consciousness of the anticipation of his own means and purpose), while others regarded that corrective as a bewildering phenomenon, and an insurmountable difficulty.

I will now make a few observations respecting the physical aspect of dental porcelain, while undergoing that phase of this change which is called checking; and also endeavour to show how it arises in dental practice; how it may be avoided, and how to remedy its effect. The appearance which marks the first stage of checking is a dulness, instead of the greasy look indicative of glaze sweating. This dulness which commences on the surface, gradually permeates the mass, diminishing its translucency the more it is conducted to the interior, until, at last, the porcelain seems to have lost its tusion quality, and has become converted into a stony substance. If the heat at this juncture is the maximum temperature of the furnace, then that furnace cannot, by any duration of its heat, fuse the changed and now more difficultly fusible silicate; but if a higher heat is obtainable, then, as the temperature rises, the porcelain gradually loses its original shape in an effort to assume the spherical form, and it continues brightening until its exterior becomes well glazed. At this stage, the fracture may present a glassy appearance, the colour is destroyed or greatly altered by the dense opaqueness, caused in a great measure by alumina being present as a component; or, if this appearance is considerably less intense, then it arises chiefly from the difference of the refractive power of the dissimilarly-constituted molecules of the porcelain, which, however, at this stage, is less marked, because mutual assimilation has already commenced at the fusion point of the most fusible and more alkaline silicate, which now acts as a solvent upon the super-silicate, and would, were this action continued with an increase of temperature, ultimately terminate the proceeding with the production of a limpid glass. In this manner, dental porcelain passes from the fibrous to the granular, and thence to the vitreous condition. The most important points to be noticed are enumerated below:—

Firstly. The checked mass cannot sweat its own glaze, nor become glossed on its exterior, at any temperature insufficient to FUSE it.

Secondly. Its opacity, if consequent on alumina being thrown out of chemical combination, cannot be removed by any expedient adaptable to the continuous gum process.

It may not be out of place to remark here that standard authority shows that, at high temperatures, silicates are capable of dissolving proportions of alumina, the chemical relation of which cannot be maintained at a lower heat ; hence its precipitation as a foreign body. And but for the learned arguments favourable to this theory, one'sself might presume, that at a temperature insufficient to maintain the relation of the atomic excess of alumina as a base to the silicic acid, the former, at that temperature, plays the part of an acid, in the formation of an aluminate of the alkali, more or less opaque, which supposition certainly shows the pigmental cause of milky glass quite as rationally as standard theory, which, moreover, the chemical composition and physical aspect of transparent felspar throws to the winds.

Thirdly. The second fusion denotes that the originally fibrous material has now assumed the vitreous condition, and is, consequently, more fragile, and less able to withstand sudden subjection to different temperatures.

Fourthly. Other conditions arise from the variable nature of different formulas.

Having, thus far, briefly described the progressive indications of checking, I will now endeavour to show how this change arises in dental practice. What has already been said, shows that dissipation of the alkali, or flux—upon the retention of which the vitrification of the porcelain depends—commences at a temperature insufficient to make the superficies of the component granules sufficiently adhesive to attract or imprison the escaping vaporised flux, which has a strong affinity for non-vitreous absorbent bodies ; therefore its escape continues until prevented by contraction of the pores, brought about by cohesion of the mass, at a temperature favourable to the operation of that force. As the flux evaporates, a withered, skinny-looking film forms on the surface, and is the first appearance of dulness which substitutes the appearance of vitrification. This plainly shows that shortening or prolonging the period of volatilisation determines the vitrification or de-vitrification of the porcelain. The last named of these two conditions, however, may arise from causes other than the roasting out of flux; for there are certain bodies which, when placed within the muffle, sometimes create, and always powerfully accelerate, this destructive action; which fact may be demonstrated by the rapid devitrification of dental porcelain when fired upon coarsely-powdered fire-brick. This treatment makes it absolutely impossible to vitrify some formulas, even though they readily fuse on a fire-clay slab. This astonishing effect might lead to the supposition that powdered fire-brick and similar substances exerted a catalytic influence over the heated porcelain, as no change in the appearance of the absorbent is for a time observable; but if the experiment be repeated many times with the same material, but using fresh porcelain each time, the former ultimately assumes a greasy appearance unmistakably descriptive of the reaction, as it distinctly points to the following facts:—

1st. The changed appearance of the absorbent is due to absorption of the vaporised flux.

2nd. The flux has been absorbed as rapidly as evolved from the porcelain mass.

3rd. All absorbents are injurious to vitrification, and some effectually destroy that quality.

4th. Some absorbents display a greediness for the flux which indicates the play of chemical affinity.

Practice proves that an atmosphere saturated with alkali cannot be a condition at all essential to vitrification of *properly prepared* dental porcelain, as a mere speck of it, the whole matter of which might be considered as insufficient to saturate the atmosphere of a muffle, may be beautifully vitrified within a new muffle. Therefore the peculiar action of absorbents may reasonably be described by elective attraction—in other words, chemical affinity. Nevertheless, an atmosphere charged with alkali, or vaporised flux, always prevents checking, and the influence of absorbents invariably promotes it. As thus shown, the general causes of checking are, firstly, the too prolonged heating up of the porcelain material; and, secondly, the presence of an absorbent within the muffle. The first named of these two causes explains the following difference:—When fuel furnaces were in vogue, gassing was frequent, but checking was then almost unknown to manipulators; whereas, since the introduction of less powerful generators of heat, viz., gas-furnaces, as at present known, gassing rarely occurs, while checking is not infrequent.

Having thus far considered the nature and cause of this phenomenon, any extension of this consideration, as it relates to modes of prevention, is unnecessary, because they suggest themselves to the mind; yet, by way of recapitulation, I may add, that none of the malproductive conditions are necessary to the working of the continuous gum process; on the contrary, they are created by unskilfulness.

Formulas which can only be fused at the maximum temperature of the furnace should never be used; they *must* be fusible at a degree considerably lower than that, or the utmost annoyance will be inevitable. It should be remembered, when applying the heat, that as soon as the porcelain surface has recovered its original appearance, after burning off the carbonaceous matter, the liability to "gassing" is removed, and, in order to prevent unnecessary loss of flux, the heat from that point should be run up as rapidly as possible.

By prolonged exposure to alkaline vapour, or vaporised flux, absorbents become saturated, and then their de-vitrifying property is destroyed; but they regain it in a less degree by the dissipation of the contained alkali through the continued action of heat. Investients of sand and plaster of paris, clay, asbestos, etc., are absorbents, as considered in relation to this subject, and may cause either "gassing" or "checking." Their freeness from carbonaceous and other foreign matter cannot reasonably be expected, and, when carefully burnt before applying the porcelain, that precaution only removes one of the two evils. Investients, however, do not exhibit much avidity for the flux, but that property is immensely increased by any unnecessary roughness of the surface. The intensely modifying influence of the granular or fragmental condition of the absorbent is exemplified by the action of coarsely-ground fire-brick. This action is not foreign to a fire-clay slab, of identical composition, but is so reduced by compactness of the material, as to be almost imperceptible. The intensity of the catalytic action of platina, during the formation of acetic acid, is determined in a similar manner; platina plate, in that respect, representing the fire-clay slab; and spongy-platina the powdered fire-brick.

Silica is practically an absorbent, and a non-absorbent. Its maximum absorptiveness is created by grinding the mineral to flour; its devitrifying power being at its minimum when its granules are distinct crystals, but the ratio of the intensity of this power is reversed when the silica is mixed with porcelain material; consequently its flour then representing the minimum, and its crystals the maximum generative condition of that action.

De-vitrification may arise also from the admixture of foreign substances, such as silica, etc., with the prepared porcelain material; the greatest care should be taken to avoid contamination with any foreign matter. One eminent dental author recommends the practice of beating the moistened porcelain upon a plaster-of-paris slab, until the superfluous water is abstracted, and the paste is reduced to a workable consistency. It is almost needless to remark, that the result of this procedure would be unavoidably disastrous, as sulphate of calcium would by that means become incorporated, and, after liberating its sulphuric acid, would, so far as permitted by the modus operandi, enter into chemical combination with the silica, forming silicate of calcium, but this operation being slowly and imperfectly conducted under the retarding influence of unfavourable conditions, results in an opaqueness, or flakiness, caused partly by the effervescence of this chemical action, and partly by the pigmental effect of the disseminated opaque uncombined lime; and if the slab was mealy, in consequence of the plaster being inferior in quality, then sufficient would become detached to make the porcelain absolutely worthless. While resisting the temptation to go on describing the relative peculiarities of other substances, I may refer any enquirer to the July 15th, 1885, number of the "British Journal of Dental Science," for perusal of a record of facts which justify my saying that Dr. Walker's allusion to "Harris Mechanical Dentistry," was most unfortunate. His reputation would be extensively considered as the most reliable guarantee for the good quality and practicability of Harris's formulas; whereas, unless he refers to a recent publication which contains fresh matter relative to this branch of dentistry, nothing more fatal to the adoption of the continuous gum process could possibly have been thought of. It is unfortunate that he should append his hard-earned and well-merited reputation to stereotyped modes and formulas which authors themselves do not care to test. Dr. Cunningham's remarks upon that point were well-timed and greatly needed.

Lastly. A remedy which purposes a reaction so extensive, complete, and perfect, as to restore the normal character of the porcelain, by an inverse ratio of the connections of the change, cannot for one moment be seriously thought of. In that sense no remedy for checking can possibly exist. When we speak of the remedy, we refer only to the treatment of two integrant consequences namely, opacity and infusibility, and, although we cannot remove those distinguished facts, we may ameliorate their effect by the superficial action of a more fusible silicate, when applied to the checked product. No attempt must be made to remedy checking by volatilising alkali in the muffle, as that would damage the durability of the porcelain by forming a more alkaline silicate, which would deteriorate in the mouth of the wearer. A volatilisable siliceous compound may be used for that purpose, and a similar result may be obtained from the application of a very thin coating of a more fusible enamel as before hinted. But skilfully constituted properly prepared formulas cannot check under fair treatment, therefore that fact is incompatible with demand for the remedy.

THE TEETH AS AIDS IN GENERAL DIAGNOSIS.

By J. R. Gnoner, L.D.S, Adelaide.

Diagnosis—whether we regard it from a medical or dental point of view—is invested with such importance, and the ability to clearly discriminate between one disease and another is so indispensable to our success in either vocation, that we must regard its study as of the greatest value to us both in the routine of daily practice. As the first step in coping with disease must be to form a correct opinion of the real nature of that which we are called upon to treat, our knowledge, observation, and experience should all be available to help us to come to a right conclusion, and get the proper cure to a rational *modus medendi*.

Hooper, in his Vade Mecum, says on this subject: "The first impression a patient makes on his physician is always an important element in the diagnosis. It enables him in most cases to form an idea of his previous habits of life; to determine whether he is suffering from a slight, or severe illness, and in many cases to decide at once upon its nature. Certain diseases are often declared in the very countenance, and many others betray themselves by strongly marked symptoms. Diagnosis is difficult where the disease is imperfectly developed, or where the only obvious symptom is one which may depend on various causes, and there is still greater difficulty when the nature of the complaint must be inferred chiefly from the patient's own description of his sensations, or, as in the case of tumours, from the mere perception of the size and shape of a part of which the structure is concealed from view. These are the cases which put the knowledge and skill of the physician to the test, and sometimes baffle both.

The diligent reader of dental literature must frequently meet with cases cited where abnormal bodily conditions are said to be caused by defects of the teeth or their contiguous structure, and that irritation is set up in parts sometimes very far removed from the exciting cause. These cases are so numerous, so diversified in character, and so distributed in position, as to afford curious instances, and instructive evidences of cause and effect in the history of human suffering.

The difficulty of correct diagnosis under many such misleading circumstances will be apparent to your educated minds. As Lauder Brunton has said: "Such causes of pain may indeed remain unsuspected even by competent medical men, and their treatment may consequently be comparatively ineffectual." It is not too much to assert that, although such patients might not in the first instance apply to you as dental practitioners for treatment, it is more than probable that eventually your advice and skill would be sought, and to you in great measure would be due the relief, and restoration to health, which had been looked for in vain at other hands.

I will now endeavour to show how far the teeth and their disorders should be taken into consideration by the physician in his efforts to fix the etiology of such pathological conditions as they may be instrumental in producing in other parts of the body to a remarkable degree. And to those practitioners who have mastered the fact that dental disease is not merely local in its effects, or limited in its influence to the oral cavity, but is capable of inflicting considerable and widely-diffused constitutional disturbance, by reason of the connection existing between the trigeminal and sympathetic nerves, there is the clue to those obscure affections of the system associated with defective states of the teeth within their grasp. Starting *ab initio*, we find at birth that teeth may already be erupted. They may be perfect in form and firm in position—in which case interference with them may be unnecessary—or they may be fragmentary, and loosely attached to the gum tissue, in which state they are functionally useless, and need extracting. Coleman, in his Manual, says of these latter: "They are the exfoliated, calcified caps of dentine of unused temporary teeth, and their existence would lead us to a strong suspicion that the child is the subject of *inherited syphilis*. During the period when the temporary teeth are erupting they come under the care of the medical attendant, and through the stages and trials of that process —a process intended to be a simple effort of nature, but, unhappily, too frequently marked by serious pathological conditions—they pass before they come under the treatment of a member of our specialty. But of "teething," its diagnostic signs, attendant symptoms, and the disastrous consequences which may follow in its wake, tending to dull the intellect, cripple the limb, and spoil the young life, I will say no more. Medical men, as a rule, know the subject thoroughly, and know how much may come out of the severe experience to the child to arrest or pervert the nutrition of its body; and treatises abound which set this forth in all its harrowing details. The deciduous series being fairly erupted, the child's endurance is further put to the proof by the rapid and extensive disorganisation which takes hold of them. The mouth again becomes a focus of irritation, which radiates through the whole system. Digestion is impaired, for the teeth which should assist the child in reducing the food to a pulp are already so broken-down and morbidly sensitive in character that they fail to perform their office. Food must, therefore, be bolted, imperfectly masticated, or rejected altogether. Acute inflammatory action in the pulp and investing membrane of the tooth will ensue, alveolar abscesses be formed, and necrosis of the tooth-remnants follow, to which other irritation succeeds, as you are well aware. Here is a combination of painful effects, to which medical and dental skill must be intelligently directed, and yet may fail to insure complete relief and comfort. In short, I know of no class of cases connected with dentition where the symptoms are so aggravated, so difficult to grapple with or effect a cure by means short of rendering the young sufferer almost edentulous for the time being. But it is a condition of things both medical men and dentists must frequently have before them, and both feel how futile their efforts are ; for the one fails to rectify the diseased local affections through the system, and the other must fain acknowledge the uselessness of applying topical remedies to fragments of teeth which have become without form, and void.

No class of ailment works more havoc with the teeth than attacks of the eruptive fevers, more especially rubeola. What Salter terms the "specific sequelæ" of those involving exfoliation of alveolus, with loss of both temporary and some of the immature permanent teeth, are phenomena well known to you. And, independent of this after-effect, it will be found that teeth previously of sound and healthy parts will, after the exanthematous fevers, quickly yield to the morbific influences which have altered, nay, depraved the nutrition of the whole body—influences having special affinities for the dermal tissues to which the teeth belong.

The transition stage in dentition, when the permanent supplant the temporary teeth, is generally accomplished without having recourse to medical aid. We dentists, for the time, have the field to ourselves. And what have we to contend with, and what may be the issue of it all? We have for our portion the permanent successors appearing in a contracted jaw, and, as a consequence, excessive displacement and an overcrowded dental arch. We may have also defects of structure, and, later on, redundant growth of the fangs or exostosis, nodular masses in the substance of the pulp, impacted teeth, dentigerous cysts, and odontomes. We may further have acute forms of inflammation, giving rise to pulpitis, and attacking the alveolo-dental membrane, followed by purulent effusion, as the result of alveolar abscess, discharges through fixtulous openings in the cheeks, or burrowings to find exit in parts more removed, and the finale may be necrosis of the jaw, with extensive loss of bone substance as well as teeth. These are a few of the more immediate experiences which dental and general surgeons may encounter as due to the teeth, and leave out of the account autral difficulties and such other of the array of tumours that may follow in the train of dental disease. All these retrogressive departures from health and physical perfection in such important structures will, in the average of cases, be productive of more or less defined neuralgic symptoms. And I may say here that patients are very vague on this point, and very unwilling to grant that their teeth have any connection with what they describe in general terms as neuralgia ; that they are ever ready to trifle with their symptoms, and try any perilous nostrum according to their caprice before they find, from repeated failure, the necessity of consulting a medical man. He may, or he may not, pay heed to the view they themselves hold of their malady, and in the first instance treat it on general principles—that is, by a course of tonics and purgatives, which may possibly, if the attack is idiopathic in character, mitigate the severity of the symptoms ; but if otherwise, will assuredly not remove the causes. But ultimately we may conclude he will recognise the exciting agent, the truth will prevail, the dental origin of the attack be acknowledged and acted upon.

In some organic changes in the teeth, the employment of drugs, either in tonic, purgative, or neurotic form, can be but of small benefit. According to their potency or proportions, they may alter or palliate the more distressing features of the malady, but the morbid action is still at work, and the reflex pain is only checked for a time. If we take exostosis of the fang as an example, we know the most rational treatment in such a case is to extract the tooth, yet we are assured that the action of the iodide of potassium in large doses may have the desired effect, and ward off operative interferences. And again, with teeth where the presence of calcified nodules lying obstructively in the tissues of the pulp, which, by their very obtrusion, produce acute suffering, who of us would look for relief from therapeutic agents, when we know that the destruction of the pulp and clearance of the canal or extraction of the tooth can be the only method which will prove final in effect ? I speak as one who would not recklessly sacrifice a tooth, if its retention by any other means could be assured, yet I must fain confess that I think in many of these phases of tooth degeneracy, the forceps is the only true promoter of health and comfort to the afflicted one. It were more judicious, where such dental affection comes under our care, and we are sure of our diagnosis, to be "bloody, bold, and resolute," and, by one supreme effort, quit the jaw of a torture that might otherwise linger on indefinitely. Extraction of teeth appears to be of little avail in that most excruciating form of facial neuralgia known as tic doloreux. It is a measure eagerly sought by the sufferer, and acquiesced in both by physician and dentist, but, in the opinion of some medical authorities, it will but distinctly aggravate the disease. The various devices of the surgeon may signally fail and no medicinal remedy abate the torments to any appreciable extent or for any length of time.

The evidences of sympathetic disorders due to diseased teeth are numerous and notable. All our professional writers on the subject give many very interesting and familiar instances; but I now give a few others you may not have met with, either in your readings or experiences:—One case is reported where pain in the neck and larynx, with aphonia, anorexia, cough, wasting and feverishness, led to the belief that the patient was suffering from laryngeal phthisis. This followed on odontalgia, and with the removal of the faulty teeth, the reflex symptoms quickly subsided and disappeared. Other cases are related where the same irritative cause produced paraplegia with cerebral symptoms—chorea, hysteria, boils and carbuncles, pains in the arm and down to the hip-joint, chronic enlargement of the glandulœ concatenatæ, which closely resembled the scrofulous variety of that affection; affections of the intestinal truck, tetanus, pain in testes, and severe spasms of uterus, all brought about by different descriptions of dental disease.

Then we have to consider cases of epilepsy, induced by tooth irritation, and although there is a great division of opinion on the point, it has been clearly proved that many sufferers from such seizures have derived great relief by treatment of defective teeth, and that such means have diminished the frequency of the attacks, if not procured positive immunity from the fits. We read also of insanity, said to be brought on by the same cause; and one instance is related, in which lancing of the gum over an erupting wisdom tooth was speedily followed by restoration to reason. These are, I apprehend, extremely rare occurrences, but their happening at all shows the desirability of looking to the teeth as a possible factor in producing dementia. The deus supientia comes within the category of highly probable causes of widespread bodily suffering. Its presence in the jaws, whether struggling against opposing forces, or fully erupted in or out of its normal position, is one of inconvenience, if not something worse. It demonstrates more than any other of the human dermal appendages, the difficulties of diagnosis which attend the many lesions connected with its irregular proceedings, and the following cases will bear out the assertion.

Nélaton says the symptoms arising from painful eruption of wisdom teeth have been mistaken for those of caries of the jaw, for syphilis, and also for cancer ; similar symptoms were taken for those of syphilitic sore throat, and treated accordingly.

Dr. Castle, of New York, was consulted by a gentleman who was suffering from what he termed "a sort of bastard sciatica," causing lameness, but which was at once cured by removal of carious wisdom tooth.

A girl of 17 years was afflicted with weakness of lower extremities, with occasional impairment of vision, the effect of want of space for erupting wisdom tooth. Giving the necessary space quickly restored the limbs, though vision remained defective.

Another case, where pain persisted for years in the hip, from carious wisdom teeth.

Canton mentions that epilepsy was cured in one of his patients by exposing crown of wisdom tooth. Other complications are known, such as abcesses opening into pharynx, and œsophagus ; and Mr. Pollock speaks of a case where the abscess opened into trachea and proved fatal.

The medical man may have brought under his notice cystic developments connected with the oral cavity, and of these the dentigerous cyst is occasionally met with. The mere absence of teeth in the dental arch cannot be accepted as a reliable diagnostic sign of the nature of such tumours, for these may have been erupted and lost, and the circumstance forgotten. Or certain teeth may be wanting, and be a heriditary peculiarity, as has been pointed out by Heath. Some of the teeth may also have come away in early childhood with the exfoliated alveolus in necrosis, after an attack of one of the exanthemata. The fact that cysts may be mistaken for solid tumours—in fact, have been so, and led to the sacrifice of extensive portions of the jaw before their real nature was discovered—should ever be borne in mind by those who have the charge of such growths, and in their attempts to extirpate them, warn them to proceed with a cautious hand. The encysted tumours, called odontomes—masses of confused dental tissues found embedded in the jaw—also call for the most careful consideration on the part of the surgeon, as error of diagnosis may again be of the most serious importance to the patient. As proof of this, I will quote Mr. Heath's own experience in such a case under his care.

In 1882 a young lady consulted him about an enlargement of bone, with fungus-like growth, in the mouth, and apparently bare bone. The appearance closely resembled that ordinarily found in a case of *sarcoma of the jaw.* An operation, involving the removal of a portion of the jaw, was declined ; and subsequently an operation for removal of supposed sequestrum of bone, after considerable difficulty, resulted in the mass described being elevated from its bed. It proved to be one of the odontomes odontoplastiques of Broca, consisting of a mass of dentine, studded with nodules of enamel. It weighed 315 grains, and measured 1½ by 1¼ inches. This case affords a very striking example of how the most eminent and experienced surgeons may sometimes be quite wrong in his conclusions, and narrowly escape committing a very extensive injury, including probable disfigurement for life. Of the other tumours of the jaw having the remotest connection with the teeth it is beyond the scope of this paper to consider. But the rule must always apply, and refers equally to the duty of every doctor or dentist, that in any case where there may be the slightest suspicion of morbid growth in any relation to the dental structures, the timely inspection of those organs is imperatively imposed on as followed up by such radical measures as their defective state may suggest.

I trust I have written enough to show that a knowledge of dental affections, and how they may react upon other parts of the body, will be an additional aid to those engaged in general practice in their diagnosis. In an age when organic disease and physical infirmities are far and away out of all proportion to perfect health and soundness of limb—when indelible taint is our inheritance, and perverts the whole current of life—it devolves upon us, whichever branch of the healing art we may represent, to accept all the enlightenment which the rapid advancement of medical and dental science can offer us, and strive to profit by its teachings. Yet when we have done all within the compass of our ability, the reflection will come to us—

"That man,
The moment of his breath,
Receives the lurking principle of death ;
The young disease, which must subdue at length,
Grows with his growth, and strengthens with his strength."

PROSTHETIC DENTISTRY.*

By Dr. K. B. Davis, of Springfield, Ill.

(*Continued from Page 733*).

In the use of these we have ample opportunity for the exercise of the highest art, in our efforts at the restoration of the original characteristics of each individual patient. These teeth are supplied by the makers in sufficient variety, in regard to colour, shape, size, and natural life-like characteristics, as to be made to very closely imitate the natural organs.

The natural teeth are by no means always of regular shape, nor are they all of the same colour in the same mouth, and they are more or less worn on the cutting edges of the anterior teeth ; so that in persons of thirty or more years of age they present a very different appearance from what they did at eighteen or twenty years of age.

In selecting teeth for each case, great care should be exercised to have them correspond in colour, size, and general characteristics to the lower teeth in cases where they are still remaining. After selecting and preparing the teeth for each case, the next step is to properly arrange them. To accomplish this requires time, patience, and more than ordinary ability. We must not be content when we have them so arranged that will neither be too short nor too long ; of the proper colour, shape, and size, or that the articulation is correct. These essential points must be observed, but something more than this must all be accomplished if we wish to fully restore all that was lost in the natural organs. We should always arrange the teeth with great care ; then seat the patient in a chair, try them in, and carefully note the expression of the patient under varied conditions ; and if they are not perfectly satisfactory, re-arrange and try again, and keep repeating this process until we are perfectly satisfied that the results are just what we wish them to be.

We now come to a consideration of the various bases for artificial teeth. Gold is undoubtedly the best base for partial plates. Its conductive properties, combined with its strength and thinness, render it peculiarly serviceable for partial plates. For entire plates it is not equalled by anything, unless it be continuous gum, and in special cases it is preferable to that. A full set mounted upon twenty-carat gold, using single plain teeth, and soldering them on to the plate and making the gum of stippled celluloid, with the New-Mode Heater, makes as strong and almost as life-like a denture as continuous gum on platinum.

Taking into consideration the deleterious effects of rubber and celluloid as non-conducting bases, and other well-known objections, is it not surprising that nine-tenths of the dentists will still persist in their universal use, to the detriment of both themselves and their patients ? A very large proportion of our practitioners have never learned to use gold or any other metal as a base for plates. If they could by any means be made to realise the extent of the injury to the mouths of hundreds of patients by the use of the vegetable bases, and if they are actuated by an honourable desire to fulfil every professional obligation they owe to the public, they cannot longer continue to use bases that are known to produce universally abnormal results.

Dr. W. H. Dorrance, of Ann Arbor, Mich., read a paper before the American Dental Association, at the Cincinnati meeting in 1882, upon the ill effects produced by the wearing of artificial dentures on plastic bases, in which he gives his observations as to the results of 211 upper partial and full cases, 165 of which were rubber and 46 celluloid ; and 47 per cent. showed a diseased condition in an aggravated form. In 91 per cent. these effects were marked, and in the remaining 9 per cent. there were no effects at all. The average time of wearing these plates was two and two-third years. In many of these observed cases the congested condition extended beyond the borders of the denture to the throat, and was doubtless complicated with general pathological conditions. Of the 211 cases above mentioned, Dr. Dorrance replaced 126 with metallic plates after such treatment as was indicated. Of this number of cases he kept enough under his observation to give a fair estimate of the value of the change, and the improvement was very marked. In all cases the patients expressed appreciation of and gratification for the change.

These observations can doubtless be corroborated by many other practitioners, and they all go to demonstrate the injurious effects from plastic bases, and most certainly force us to the conclusion that they should not be used. If we are disposed to do entire justice to those who need artificial substitutes, we must see that they are supplied with what we know is proper for them, and thus secure the best results; and any dentist certainly places himself in a very bad light before his own conscience if he longer refuses to qualify himself to render as meritorious services as does any other practitioner in the entire profession.

Continuous gum on a platinum base is undoubtedly, when properly made, more nearly perfect than any other material for entire dentures. It has its objections, as have all other kinds of artificial plates. Its merits are highly appreciated by all who have worn it. Its construction requires much skill, patience, and artistic taste, but it well repays all the efforts one may bestow upon it in the unsurpassed beauty of the finished denture and gratification of the patient. With the various new furnaces now in use its construction is much easier than formerly.

Having thus considered the departments of prosthetic dentistry which relate to the construction of artificial dentures upon the various bases, we now come to a consideration of the merits of artificial crowns and the so-called bridge-work, concerning which so much has been said and written during the last few years.

Whilst it is in the province of prosthetic dentistry to supply to the oral cavity any lost organs, it should never be allowed to contravene the conservative efforts of the operative department; consequently it becomes the imperative duty of every operator to preserve every root that can be rendered useful by the most efficient methods of crowning. The merits of the best methods of crowning are so universally admitted at this time that I deem it unnecessary to enter into any argument in regard to the utility and efficiency of this method of saving untold numbers of roots. They can thus be rendered both useful and of vast benefit to the personal appearance, and at the same time we can avoid the very unpleasant annoyance of a plate. Moreover, we are all well aware of the difficulty, not to say the impossibility, of some mouths retaining a plate so as to be used with any degree of comfort. In numberless cases, if we do not resort to crowning, our patients are compelled to wear a plate all through life, merely to supply the loss of one or more teeth. Again, in many instances, it will be far better for both operator and patient to resort to crowning instead of many of the extensive contour fillings, which are often inserted into frail teeth of poor structure.

In regard to the so-called bridge-work, I would not be understood as advocating its extensive use. However, there are frequently cases of the loss of one or more of the anterior teeth, when there are on either side good roots that can be rendered healthy by proper treatment. Upon these roots crowns may be accurately adjusted, to which we may attach one or more teeth, thus supplying the lost intervening tooth, or teeth, as the case may be, and if the entire operation is conducted with extreme care and accuracy, I do not hesitate to say that they will give great satisfaction to the patient, and will be as clean as any other device could possibly be under like circumstances. I do not advocate the insertion of entire dentures upon this method, for obvious reasons; but in those cases above noted we can most assuredly render eminent satisfaction to our patients, and at the same time obviate the necessity of covering the palatine surface of the mouth with a foreign substance.

ON THE TREATMENT OF PYORRHŒA ALVEOLARIS.*

By J. HENRY WHATFORD, Eastbourne.

The writer refers mainly to a mode of treatment proposed by Dr. Philip Crampton, of Dublin, who was himself a sufferer from pyorrhœa.

He found sulphate of copper act as a complete cure in his own case, and he cured many others similarly affected. For the last two and a-half years the writer employed this method of using sulphate of copper in some well marked cases of pyorrhœa alveolaris (two of them very unpromising), and in the great majority found it curative.

Pyorrhœa alveolaris in its early stage appears to be a form of local inflammation resulting in separation of the margin of the gum from the necks of the teeth, and the formation of a pocket for the lodgment of foreign bodies, the gum at the same time changing its colour from the normal pale rose hue to a darker colour, becoming spongy in texture, swollen, readily bleeding on slight provocation, and its margin becoming rounder and averted from the necks of the teeth. This may exist for months or years, with so little inconvenience as scarcely, if at all, to attract the attention of the patient. As the disease advances the symptoms increase, and there supervenes a sense of fulness, throbbing, and gnawing irritation. Slight pressure on the gum surrounding the teeth causes a drop or more of thick, sometimes fetid pus to exude at the necks of the teeth. The teeth lose their proper sensibility, gradually become loose, and the denuded fangs become often coated with a tenacious layer of very hard greenish-brown tartar, and if the disease be allowed to progress without treatment, the alveoli get absorbed, and the teeth drop out. This disease is found apparently in every constitution, healthy or otherwise ; indeed, the general state of constitution seems not to affect the disease. It appears to be sometimes hereditary ; local injury seems an exciting cause in some cases.

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* Read before Southern Counties' Branch of the British Dental Association

The local effects of pyorrhœa resemble those of scurvy ; however, the last named disease has very marked constitutional symptoms of what pyorrhœa has none.

Scurvy can generally be traced to constitutional degradation, owing to want of proper nutriment. Again, scurvy is generally readily curable by proper nutriment combined with constitutional treatment and cessation from hardship ; local treatment being unneeded ; whereas in pyorrhœa local treatment is all-important, and constitutional of slight avail. Some refer the origin of pyorrhœa to the alveolo-dental membrane, others believe that the alveolar process is first affected, while others attribute it wholly to neglect in cleansing the teeth, and thus allowing tartar to accumulate between the necks of the teeth and the gum. Mr. Charles Tomes has related a case of a patient, aged 25 years, in which all remaining teeth were removed, and on many of them distinctly affected there was no tartar. Dr. Arkövy, of Buda-Pesth, found that, besides pus corpuscles, threads of leptothrix buccalis were always present in abundance, and concluded the fungus was intimately connected with the origin of pyorrhœa alveolaris. Dr. Islai and others have confirmed these results. A case is quoted exemplifying that the purely surgical treatment advocated by Dr. Riggs is not always successful.

Mrs. P., æt. 34, no family, somewhat anæmic in appearance, with good family history, and in very good health.

About three years ago she noticed that her upper and lower central incisors were becoming loose, and her dentist prescribed some remedy, which for a time eased her discomfort ;

the gums, however, became rapidly spongy, the teeth looser, causing considerable discomfort, and at times pain. Her gums were scarified ; tannin, carbolic acid, acetic acid, and other remedies were tried without avail, and she gave up all idea of further treatment. Coming under Mr. Whatford's care, he decided to try sulphate of copper. At the time of her visit the incisors of the upper and lower jaws, and the bicuspid teeth of the upper jaw were very loose, and the neighbouring gum deeply congested, tumid and thickened, and detached from the fangs, which were coated with hard tartar, more particularly those of the lower teeth, and on pressure a thick discharge appeared between the teeth and gums. For the first two or three days a little finely-powdered sulphate of copper was packed between the gums and teeth by means of a piece of wood suitably shaped, and an improvement in comfort and in the appearance of the gums appeared on the second day. When the gums had improved in colour, and the sponginess had disappeared, he removed the tartar, which could not be done earlier without causing pain. For seven successive days he packed the finely-powdered sulphate of copper under the gum and around the teeth in the manner described, and then, after a week's interval, renewed the treatment for four more days. The discharge ceased after the seventh visit, but the upper teeth were soonest well ; eight daily applications sufficed to cure them ; the lower teeth gave more trouble, probably owing to the difficulty experienced in thoroughly applying the remedy on account of the ready flow of saliva it appeared to cause. Eventually, however, all the teeth became quite firm. More than a year since the commencement of treatment the mouth was found to be in perfect health. Two or three applications of sulphate of copper cause such a contraction of spongy gum as to steady the teeth, and make the operation of removing the tartar comparatively easy, and Mr. Whatford removes it at one, or at the outside two visits.

When cases have been of long standing, it is necessary to apply the sulphate of copper at once for eight or ten successive days to ensure immunity from relapse ; there is no risk in careful hands in freely using sulphate of copper ; it is better even to overdo it a little to make sure of a good result. In early or slight cases fewer applications will suffice. The caustic should be used as a saturated solution, or in powder. Some little pain results from the use of caustic, and this is greatly relieved by holding cold water in the mouth. It is well to prepare the patient for this irritation, which arises at intervals during treatment, lessening gradually, eventually disappearing. The copper taste can be readily removed by a sip or two of bi-carbonate of soda solution, and almost prevented provided the sip be taken while the powder is lying on the gum, and before it becomes mixed up in the mouth by an attempt to expectorate before the sip is taken. In applying sulphate of copper to the gum of teeth in the lower jaw, the saliva ejector may be used; a teaspoonful of a solution of bi-carbonate of soda is introduced into the mouth as the bulb of the ejector is withdrawn, the patient being told to take a mouthful of water and shake it well about before expectorating.

The properties of sulphate of copper are then considered. It is as a styptic for bleeding surfaces, a stimulant for ulcers, and an escharotic for warts. It is used as a lotion and as an injection to diminish excessive secretions from mucous membranes; 10 or 15 grains in two ounces of water forms a prompt emetic; half an ounce taken into the stomach would probably kill, so that the quantity employed in the treatment of pyorrhœa could hardly produce toxic symptoms, especially if carbonate of soda in solution be employed as is recommended above.

Mr. Whatford prefers sulphate of copper as the remedy to other caustics, because (1) Its action apparently involves less loss of tissue, while its curative power seems to equal any. (2) It does not blacken the teeth as nitrate of silver does, nor act on their structure as acids do, nor spread over more surface than that intended, as chloride of zinc, caustic potash, and some others are liable to do. (3) Its application, as a rule, causes little pain; its action as a caustic is so limited that the gum freely granulates under its use, and therefore it can, in most cases, be applied daily till cure is apparent without checking these granulations as other caustics are liable to do. (4) Its continued use leads to no detriment, and in most cases a feeling of relief and comfort arises shortly after its application.

British Journal of Dental Science.

LONDON, SEPTEMBER 1, 1886.

DENTISTS AND GENERAL EDUCATION.

The near approach of our students' number makes one naturally turn one's thoughts upon the question of the preliminary education of dentists. That this subject possesses great interest for the profession at large, has recently been demonstrated by the various papers and addresses lately published. Nor can we afford to pass the matter by with mere commonplace utterances, or carping criticism ; nothing is more unsatisfactory than the petulant spirit which prompts certain persons to cry, "I am Sir Oracle, let no other dog bark ;" or, on the other hand, nothing more selfish than the would-be superior being who cannot consider so dry a subject as education.

There is nothing more certain than the inexorability of the laws of evolution when applied to the growth of society. The individual interest must become merged in the commonweal, and so is it that the unit of the dental world becomes the willing or unwilling servant of the rank and file of the profession of dentistry. With the improvement of the educational standard of dentists as a body, the individual dentist takes a higher position ; but the isolated, well-read, well-mannered practitioner does but little to the mass, at least of his own generation, and whatever good he may accomplish is in the direction of the establishment of societies, of conjoint schemes, and such like.

In the matter of education, as in everything else, each teacher is apt to become a *doctrinaire*, and to promote a propaganda, but, by a careful collation of the ideas of the many, one is able to arrive at a fairly workable scheme. Mr. Morton Smale, in a paper given, before the recent meeting of the British Dental Association, spoke of the benefit that dentists had derived from the establishment of a preliminary examination, and gave it as his opinion that the matriculation of the University of London was the best adapted for the requirements of the dental student. We must remember that Mr. Smale, as Dean of the London Dental Hospital, has a right to claim every attention ; for his post brings him into the most close and searching intimacy with the dental tyro ; so that his thoughtful expositions of the "whole duty of dental students" should be carefully conned by those who want to know what to do with the sons. Whether Mr. Smith Turner's advice is as practical seems to us open to question. Few men deserve more thanks for a vigorous life loyally spent in the advancement of his profession than does the accomplished chairman of the past Association meeting. Mr. Smith-Turner's address to the students of the London Dental Hospital, upon the occasion of their prize distribution, rang the changes mainly upon the necessity of increasing the classical side of the dentist's preliminary test. If we heard him aright, he would place this side of the mental training paramount, whereas the natural sciences, which appear to us to dovetail better with the after life-work of the dentist, would sink into a subsidiary position. Of course the answer to our objection is, that men who will devote their mature years to one side of a question, ought to establish a counterpoise during early life, and so strike an equilibrium, and avert the calamity of growing into a warped, one-sided monstrosity.

The æsthetic aspect of a dentist's career, again, has been urged upon us. The eye trained to the exact study of the lines of beauty, which regards the facial deformity arising from edentulous jaws as a departure in cosmetic pathology, should be the dentist's ideal ; and so should his hand know the tenderness learnt only by daily use of brush or pencil, that it must possess that deftness which belongs to the past master in his art.

To such an end, we should be told, familiarity with the classics tends ; it establishes mental " lines of going " which must lead rather to the contemplative than to the muscular existence. But, as taught in the United Kingdom, Latin and

Greek are seldom mastered, even when a "pass" at one of the older universities is at last toilfully attained; and so, unless a smattering of the lingo of "ghostly voices, faintly heard from the limitless past" be considered satisfactory, we should have to lengthen our dental curriculum by four years, to be spent at Oxford or Cambridge. Another consideration—by no means a light one—is that, unless boys receive their training in natural science early, they seldom really grasp the practical application of their learning to their life's daily work.

Questions of pneumatics, of dynamics, of statics, problems in thermo-dynamics, in electricity, and in vital chemistry are daily brought under the dentist's observation; and these he may dispose of in either of two ways. He may beg the question, and establish a practice of rule of thumb, or he may reduce the vital problem to a simple scientific basis, and solve it as methodically as though it were a problem set in his tripos paper. Which way is best? As to the mental gymnastics afforded by the dead languages, many, we believe, will agree that mathematics, the necessary adjunct of mastery of physical science, when coupled with the study of French and German, will afford plenty of exercise for the nascent mental faculties, and give them ample opportunity of revealing whatever inchoative powers they possess. The scientific dentist can hardly afford not to be conversant with the literature of France and Germany; and life is so short, and art so long, that he may be excused if his recollection of Herodotus and Terence is vague; although, to be a truly happy man, we are quite sure he should know his Horace by heart, and sleep with his Iliad beneath his pillow.

THYMOL AS A DISINFECTANT.—For a liquid preparation advantage should be taken, says the *Chemist and Druggist*, of the readiness with which thymol combines with alkalies to form compounds soluble in water. This method appears to be the most practicable for a solution stronger than 1 in 800, as the use of spirit is out of the question. Combination with carbolic acid will not affect the solution. The basis of a powder should be a mixture of powdered bran and finely-ground sawdust, both of which can now be obtained at a cheap rate One per cent. of thymol and 5 per cent. of carbolic acid would be sufficient to combine with these, the antiseptic being previously mixed together until liquefaction is complete. The powder may be coloured with a trace of aniline red.

ANTISEPTIC TOOTH WASH.—Magitot proposes to wash out the mouth several times a day with a wash containing two parts borax, one thymol, in a thousand distilled water. Dr. Pierre, of Paris, has also recently introduced into this country a dentifrice both for a wash and in the solid form. Although it is against our rule to commend proprietary preparations which do not contain an open prescription, we may say Dr. Pierre's wash is highly fragrant, and appears to cleanse well, and is pleasant to the eye.

BITING OFF THREADS.—The *Ohio State Journal of Medical Science* says:—Many ladies use their artificial teeth as substitutes for scissors; and such use of them soon renders repair necessary. When told they should not bite threads with them, they are surprised, and sometimes exclaim, "Why, only a thread? why Mrs. Blank bites bread crusts with hers!" Then they should be taught not to use even their natural teeth for such purposes. But few think in biting off a thread the entire muscular force of the jaws in use is concentrated into the small space measured by the diameter of a thread. Besides, thread after thread is applied to the same place on the teeth, and thus the enamel is broken there.

RAOUL-PICTEL DISINFECTANT FLUID.—The liquid, which is described as being "carbonic sulphurous acid gas liquified at 190°," has been the subject of experimentation in Detroit. The experiments are said to have demonstrated that perfect local anæsthesia could be produced instantly by an application of the liquid, and that it continued for some time. A finger was subjected to a bath in the anæsthetic, when it became ice-cold, and no blood oozed from the wound of a needle thrust to the bone. It was then cut and dressed slowly, the operation taking some moments, and not the slightest sensation was experienced. Experiments in dissecting rabbits treated locally in the same way were also conducted. Further experiments have shown that this liquid instantly kills all germ life, so that no danger of blood-poisoning can exist in dressing wounds first treated with it. It is believed that these experiments promise a complete revolution in surgical methods. Of course, one must wait for confirmation of these experiments. Sulphurous acid as a disinfectant has long been known, but it is not by any means an accepted fact that it is a perfect antiseptic agent. We should be glad to learn whether the anæsthesia was due to the cold, or to a specific effect upon the cutaneous nerves.

IODOFORM IN NEURALGIA.—A mixture of one part of iodoform to ten or fifteen of collodion, if spread repeatedly upon a neuralgic surface until it attains a thickness of one or two millimetres—is said by a writer in the *Neuralogical Review*—to be quite effective in the treatment of certain neuralgias. If the first application does not speedily terminate the neuralgia, those who have used this mode of treatment, direct that its application should be continued. It seems especially valuable in the relief of neuralgias of the trigeminus. It also seems of value to be applied along the spine, particularly at painful points in what is called spinal irritation.

As a Tooth Powder, Mr. Howarth commends a mixture of soap, chalk, chlorate of potash, and myrrh ; but refrains from mentioning quantities.

"THINGS ONE WOULD RATHER NOT HAVE DONE."—The *Southern Dental Journal* says:—"The dentist who eats onions, drinks beer, and chews tobacco, should be banished to the Feejee Islands. No danger of cannibalism in his case."

Dentifrices and Tooth Washes.—A writer in the *Chemist & Druggist* recommends :—

Cretæ præp.	1 oz.
Sapon. Castil.	1 drachm.
Acidi carbolici	10 drops.
Ol. eucalypti.	20 drops.

M.

With this the teeth must be well washed at least twice a day

In the same Journal we find the following recipe :—

(Carbolised Tooth-Wash (Foaming).

Quillaia bark (in coarse powder)	4 oz.
Glycerine	3 oz.
Rectified spirit.	5 oz.

Macerate for three days, then add-

Carbolic acid	ʒj.
Oil of Wintergreen	20 drops.
,, Cinnamon	5 drops.
Cochineal	5 drops.
Water	30 oz.

Again digest for three days, shake frequently, and filter.

In the *Journal of the British Dental Association* we find the following recipes proposed—

℞ Pulv. Saponis.	ʒiss.
Cretæ præcip.	℥iss.
Otts. de Rosæ	gtt. VI.

(W. Donston.)

Mr. England speaks well of a receipt of Mr. Sewill's as follows—

℞ Pulv. Sapon. Castil.	ʒij.
,, Iridis	℥ ss.
Sodæ Bibor.	ʒij.
Cretæ Precip.	℥ij.
Ol. Carioph	♏ v.
Ol. Lavand.	♏ x.
Otto Rosæ	♏ v.

M. fr. dentifrices.

℞ Pulv. Sapon Castil.	ʒij.
,, Iridis	℥ ss.
Sodæ Bibor.	ʒij.
Cretæ Precip.	℥ij.

M. fr. dentifrices.
Adde

Acidi Carbol.	ʒi.
Oil. Eucalypt.	ʒij.

Another correspondent of the same paper recommends the following:—

℞ Pulv. Myrrhæ	℥i.
Terra Rosæ	ʒ ss.
Acid Carbol. pure	gtt. xxx.
Pulv. Sappo Castellat	℥ ss.
Otto Rosæ	gtt. xx.
Ol. Caryoph	gtt. 40.
Creta Peppermint	Hj.

Misce intime et cola.

Abstracts of British & Foreign Journals.

INDEPENDENT PRACTITIONER.

IRREGULARITIES OF THE TEETH AND THEIR TREATMENT.

By F. E. Howard, M.D.S., Buffalo, N.Y.

It is often necessary to bring down the canines to their proper position, the irregularity being caused by lack of room. This usually requires the extraction of a tooth on either side, which tooth needs extraction is decided by the operator. It may be the first molar, first or second bicuspid. If one or more of these teeth are extensively decayed, and the others are comparatively sound, it is better to take the weaker ones out, even at the expense of appearance, so as to get the most hope of useful teeth, both for the time being, and for the distant future.

We should simplify the operation as much as possible. We should not keep young subjects in our hands for months, when by simplifying the operation as many weeks would suffice to accomplish results that are practically as good.

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*Read before Union Meeting of the Seventh and Eighth District Dental Societies of the State of New York.

Very slight deviation from a normal positon does not warrant interference in all cases, particularly in boys' mouths. In the majority of cases, the writer thinks we are warranted in removing the bicuspid and pulling the canine down to place ; at other times the extraction of the canine and the cutting off of the inner cusp of the bicuspid and converting it into a canine would be far better. By properly cutting the inner cusp from time to time, a slight elongation will take place that will give it a very natural appearance.

Sometimes the canine occupies nearly the place of the lateral incisor, and the lateral assumes a very ugly position, being very prominent or depressed, and an attempted change in the position might be doubtful of success. A deviation from nature's arrangement is not always so deplorable as one might imagine. The shaping of the teeth will often cause them to lose their identity in the original type. This can be accomplished by very simple methods, when other changes might involve long, tedious, and complicated operations.

When we have a narrow arch and desire to expand one or both jaws, the writer finds the Coffin spring-plate the best for general use. The adjustment of a plate of this kind to the upper jaw will also expand the lower by the force of occlusion. The action may be confined to one or both jaws in the construction and adjustment of the plate.

A modification of the Coffin spring will be useful in many different ways ; if the arch is to be expanded in the main, a spring bent in the general form of a W is arranged in position about midway of the plate, and when vulcanized the plate is sawed through the centre, the spring slightly opened and the plate placed in position. From time to time this is spread as the case requires.

When the anterior portion of the arch alone is to be spread, a hinge made of two eyes and a bar, joined and vulcanized into the posterior portion of the plate will hold the posterior part, while the spring will act upon the anterior part alone, or this may be reversed and the back teeth spread at the will of the operator, as the case may require.

Instead of this a simpler method will sometimes do. Drill two holes in the back part of the plate, and with a strong silk ligature or platinum wire bind the parts together, and this will hold them from spreading at this point.

A piano-wire spring, vulcanized into the plate, is also very effectual for moving a tooth out when it is inclined in the mouth and it is not desirable to use a jackscrew. For the movement of canines and bicuspids, a band of platinum with a projecting top or knob cemented to the tooth, is admirable to retain the rubber or silk ligature in position, and to draw the tooth in its proper course, the ligature being attached to some point on the plate, or to a hook attached to some tooth not likely to change position by the force exerted. For the rotary movement of a tooth, a band of platinum, with an arm attached and cemented to the tooth, is said to be useful. Tying a wax silk thread to any of the four anterior teeth, taking two or three turns around the tooth and attaching to a rubber ligature fastened at some convenient point in the plate, is successful. The force exerted is in a direction to unwind the ligature from the tooth, and thus it is turned in its socket.

When any one of the six anterior teeth is crowded into the arch, and the space is partly closed so as to prevent the passage of such a tooth out of position, an excellent method is to construct a Coffin spring-plate for the expansion of the arch, and while the jaw is being expanded the tooth is forced out with a jackscrew, when the teeth are allowed to return to their original position.

One or more of the upper teeth may shut upon the lingual surface of the under ones. These the writer controls by making a plate that embraces both jaw and teeth, keeping the teeth partly separated. A band of vulcanite is allowed to extend along the labial surface of the teeth, reaching well up. In this band, opposite the depressed teeth, slots are cut for the retention of elastic bands, and when in position they are looped over the teeth, and the force exerted is in a direction to carry them out to their proper place.

A gold or platinum band vulcanized into the plate, extending around in front of the teeth. When the teeth have passed over sufficiently far, the plate is to be cut away from the grinding surface from time to time, then the occluding force much assists in the work.

In making radical changes in the position of teeth, some inflammation ensues, and often portions of the gum will protrude between the plate and teeth, requiring treatment. Aconite and iodine (equal parts) will relieve the inflammation, and a chromic acid solution checks the hypertrophy. It may be needful to excise the hypertrophied gum and apply the chromic acid.

Protrusion of the lower jaw can ordinarily be corrected in young subjects by making a chin cap or pan of brass, swaged to fit the chin, with two eye loops about two inches apart on either side. These are attached to a cap worn upon the head by strong rubber bands running above and below the ear. The upper bands mainly hold the apparatus in position, while the lower ones principally do the work of carrying the jaw back.

When there is excessive development in the tooth, it may be advisable to extract one or more on either side, and carry the anterior ones back by the usual methods. The circumstances of the case will entirely govern the operation.

SOUTHERN DENTAL JOURNAL.

BRIDGE-WORK.*

Dr. Hassall's Opinion of it.

It would be unfortunate for the patient, as is usually the case, to be compelled to wear a plate just to sustain a tooth ; so that a tooth soldered to a bar, the ends of which could be inserted in the adjoining teeth, in gold or even cement fillings, would be perhaps the lesser evil.

But if several teeth are attached to two sound teeth, enclosed in gold bands, the cement with which they are finally fastened in place, by constant use of the denture, is loosened and disintegrated, and works out ; the secretions flow in, and the tooth is girdled with decay. These teeth loosen by the use of the teeth attached in mastication. Then there is a certain amount of uncleanliness, even in the best adjusted cases ; parts that *cannot* be reached to cleanse—and finally, difficulty of repair.

The least objectionable are those cases where they are attached to roots ; but here results, in a few years, at most, the loosening of the roots, in consequence of the strain upon them of an entire denture, in the act of mastication ; and the patient has been to an extra heavy expense to secure the work, and now it is worthless, and must resort to the inevitable suction plate, which had better have been made at first.

In a vast majority of cases where bridge-work is used, a narrow, nicely-fitting gold plate, secured by *properly-adjusted* clasps, upon the same teeth which had been permanently enclosed for bridge-work, would answer the same purpose, and could be readily removed for cleansing, and no harm done to the natural teeth.

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* Written for the South Carolina Dental Society.

Properly adjusted clasps mean a narrow (platinum alloyed gold) clasp, nicely adjusted to the tooth, and arranged with wax upon the plate, *in the mouth* (never by a plaster cast). Then it is recommended to invest in the plaster and sand, and solder, attaching *only at one point*, one-eighth of an inch, or but little more, so that the clasp will be springy, and have free play.

SECRET PREPARATIONS IN PHARMACY, AND PATENTS.*

By B. H. Catching, D. D. S.

Secret preparations in pharmacy are spoken of as a burning shame. In the first place, he who puts forth a secret preparation, assumes to know it all, and proposes that intelligence shall be chained, while empiricism shall flourish. To the patrons of such preparations belongs the acknowledgement that all of our facilities for improvement are for naught, or that they are sadly deficient in the very fundamental principles of medical education. This great evil cannot be checked while those of us who are presumed to lead the profession patronise and endorse such productions. Secret preparations in pharmacy should be denounced. With what intelligence is the physician practising his profession who prescribes from the thousand and one secret preparations now flooding this country? Dentists, as specialists, should be careful to avoid all patent remedies whose exact composition is unknown.

The promotion of patent medicines is simply done to make money; and so long as we continue to buy and prescribe just so long will we continue to aid in lowering the professional standard.

Dr. Catching says he can safely lay a large part of this blame at the doors of Colleges. His observation has been, that in them theoretical medicine is not thoroughly taught, while clinical medicine is not taught at all. The course of instruction is limited too rigidly to dentistry pure and simple.

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* Read before the Georgia Dental Society, May, 1886.

While a graduate of that school was bold enough to speak his mal-formed ideas, are there not those who have graduated from other schools simply acting the same thoughts? Certainly they are, when for their resources in materia medica and therapeutics they must depend upon secret preparations.

Speaking of patent remedies Dr. Catching says, there is a difference between a patented appliance and a secret preparation in pharmacy. The patent appliance is made for a specific work, under the guidance, skill and observation of the operator. It is not hid in mystery and secrecy.

Literary Notices and Selections.

A CRITICAL ESSAY ON THE DEVELOPMENT AND MINUTE ANATOMY OF THE TEETH IN HEALTH AND DISEASE.

By J. L. Williams, D.D.S., Philadelphia, Pa.

(Continued from page 768).

All of that portion of the tooth-sac which covers the crown usually disappears, or is modified, as I think, into the so-called *ligamentum dentium*, without assuming that function which is the special work of the lower part from which the cementum is formed, and which remains as the peridental membrane or pericementum surrounding the completely-formed root. No one who has studied the development of this last-mentioned tissue could be led into the error of speaking of it as a double membrane. It has, as I pointed out in my earlier papers, a double osteogenetic function—that is, the inner portion lying next the cementum contains the cementoblasts, while the outer portion lying next the alveolar walls contains or consists of the osteoblasts or bone-forming cells. But no misuse of terms and comparisons can construe its significance into that of a double membrane.

From this slight digression we again turn to a further consideration of the structure of enamel and dentine in health and disease. I must deny *in toto* the theory that there are special enamel-fibres in the sense that the prolongation of the odontoblasts are fibres.

Enamel is, as we have already seen, formed in an entirely different manner from dentine. Dentine is formed in territories of which the odontoblast fibres are the centres. The method of the formation of enamel is quite the reverse of this, for the only portion of enamel which can be spoken of as organic *surrounds* the enamel-prisms. When enamel is cut longitudinally, there *is* an *appearance* of fibres, but it seems very strange that those who have written so much about enamel-fibres have not seen that this appearance results from the division of this organic matrix which surrounds each prism. A transverse section demonstrates this, and it is a notable fact that the only transverse section of enamel shown in Dr. Heitzmann's book presents no appearance of these hypothetical enamel-fibres. Such an appearance would be utterly inconsistent with the method of development and arrangement of the enamel-prisms, and yet these fibres are shown in all of the longitudinal illustrations.

There is sometimes, though not frequently, observed in developing teeth, where the enamel-forming cells are pulled away from the partially calcified enamel, an appearance of fibres. I have also occasionally seen, in developing teeth, an appearance, in cross or transverse sections, like a nucleus in the centre of the enamel-rod.

Dr. Suddoth's explanation of this appearance is so concise and clear, and so in harmony with my own observations, that I quote from him. He says, when speaking of the ameloblasts being torn from the semi-calcified mass of forming enamel: " This semi-calcified material, which adheres to the ameloblasts," as they are drawn out, " gives the appearance of a fibril or prolongation of the cells themselves. These fibrils, which have been called Tome's processes, I consider as thus being mechanically made, for they do not always appear, but depend upon a certain condition of the calcified material. They do not occur persistently, as do the fibrillæ of the odontoblasts. I have succeeded in demonstrating them in sections of pigs' teeth, under favourable circumstances, where they showed very plainly indeed, being nearly or quite as long as the ameloblasts themselves, *and several times longer than the enamel was thick.*" It is as though one were to dip the ends of one's fingers in a thick syrup, and on withdrawing them the syrup would be drawn out in strings as the ameloblasts draw out the gelatinous matter on the surface of forming enamel. This is the only appearance of fibres to be seen, and this only in forming enamel. It is therefore seen that this appearance has nothing in common with the so-called enamel-fibres described in Dr. Heitzman's work. To what conclusions are we forced by the evidence? That enamel, once completely developed, undergoes no structural change during life, and probably no molecular change,—at least, not in that portion which constitutes ninety-seven per cent. of its composition. There is the highest probability that all changes which occur in enamel are the result of the slightly increased or diminished amount of fluid which may penetrate from the dentine or the surface. The human body is not the scene of a hodge-podge of physiological activities. There is order and exactness everywhere. Bile is not secreted in the kidneys if the liver happens to be out of order; neither will the lungs elaborate chyle out of food-material when the digestive tract refuses to perform its functions. There is intimate relationship and mutual helpfulness everywhere; but if evolution and development mean anything, they mean division of labour and specialisation of function. Dentine is not formed from osteoblasts or cementoblasts, nor is cementum formed from the odontoblasts. Neither can the material from which enamel is built up be elaborated in any other way than through the ameloblasts. How careful the surgeon is to preserve the periosteum if he desires a reproduction of bone! He knows, if its formative organ is destroyed beyond recovery, that there will be no further reproduction of bone at that point. Now, it must be remembered that enamel is the only tissue of the body the formative organ of which not only disappears, but the enamel itself is removed from the position of its development, and completely isolated from all tissue concerned in its formation. This is a fact of great significance, and places enamel in a unique position, physiologically speaking, in which it cannot be compared to any other tissue in the body. The odontoblasts and their processes, the fibrillæ, are the elements by means of which the dentine is formed, and they remain after development is completed to maintain the continued integrity of the dentine. And thus it is also with bone and cementum, the formative organs of which remain as the source from whence these tissues receive their nutritive supply. Not so with enamel, however. The ameloblasts are the enamel-formers. Its peculiar morphology and its molecular structure are impressed upon it by these histologic elements. They completely disappear, after which there can be no further formation of enamel. We have no evidence of structural change in enamel after the eruption of the teeth, and structural change, by which I mean change in molecular relationship, is the only change which could improve defective enamel. The apparent increased or diminished liability of the teeth to decay during life must be very largely attributed to change in environment, changes in the character of the secretions and fluids of the mouth, rather than to any inherent change in the enamel itself. An increased proportion of organic matter in enamel, within certain limits, by no means necessarily implies increased liability to caries. Every closely-observant dentist knows that a departure from the proper proportion of organic and mineral matter in either direction may result in increased liability to decay. But every dentist of thoughtful experience also knows that more depends upon that initiative organising force which governs the formation of enamel than upon any changes which ever occur during life. The fact that teeth which are *well* developed will endure the adverse conditions of a life-time without serious damage, and, on the other hand, the fact that teeth poorly developed cannot be changed into teeth of excellent structure, at least so far as the enamel is concerned, by the continued good health of a life-time, is very strong evidence of the truth of my propositions. Understand me, I say that those improved conditions which we all observe and which decrease the liability of the enamel to caries, are largely, probably entirely, due to changes in the environment of the teeth rather than to any change in the structure of the enamel. In truth, change in environment is alone quite sufficient to explain the decreased liability of the teeth to decay. There is no one in our profession to-day who has done more thoroughly scientific work in the investigation of caries than Dr. Miller, of Berlin. I can hardly speak too emphatically of my appreciation of his labours. Dr. Miller's investigations have demonstrated, to the complete satisfaction of any mind which can appreciate the significance of genuine scientific work, that the active immediate causes of caries are acids,—largely those generated in the mouth by fermentation,—which cause decalcification of the mineral constituents, and certain micro-organism which destroy the organic matter. Any change, therefore, whether in the nature of local prophylactic or antiseptic treatment, or general systemic treatment, which removes or improves those conditions which are favourable to the formation of nitro-organism, is quite sufficient to explain all decreased liability of the teeth to decay. The statement made by Dr. Abbott, in his recent paper, that the increased liability of the enamel to pathological changes which is observed as accompanying change of climate and food-habits, is due to changes in the living matter of the enamel—will not for a moment bear the light of real scientific investigation. In former papers, and in his chart representing section of an incisor tooth *in situ*, Dr. Abbott claims that embryonal or medullary corpuscles are formed in the retrograde metamorphosis of enamel. Dr. Heitzmann also teaches the same doctrine in his book. It might be regarded as needless effort to do more than demonstrate that such a retrograde process is impossible from the stand-point of the method of development of the teeth, as I have already shown. But the so-called inflammatory theory has taken such a strong hold upon many in the profession that it only can be uprooted by placing the absurdity of its claims in the strongest possible light. It may be that in the decay of living teeth in the mouth there is a condition which is the correlative of inflammation in the soft tissues, although the relation is probably very distant and obscure ; but this point, if admitted, has no bearing upon the appearance of medullary bodies in caries of enamel and dentine.

In the sixth statement of his summing up of his series of papers on the relation of fermentation in the human mouth to caries of the teeth, Dr. Miller says: "I produced caries artificially, which, under the microscope, cannot be distinguished from natural caries, by subjecting sound dentine to the action of these fungi, in fermentable solutions" Dr. Sudduth will place under the microscopes for your inspection some of these slides, kindly sent me by Dr. Miller, and also some of his own preparation, showing natural and artificial decay of dentine. You will see that it is, as Dr. Miller says, impossible to tell from the microscopic appearances which was naturally and which artificially produced decay. It can hardly be necessary for me to say that no intelligent person would think of making the statement that a dead tooth out of the mouth could return to an embryonal condition. If, then, it is not possible to tell by microscopic examination natural decay from that artificially produced, what becomes of the inflammatory theory of decay? If Dr. Miller's work has *any* value, if *any* conclusions may be drawn from it, then he has certainly demonstrated that the return of dentine and enamel to an embryonal condition, even if these tissues were so built up, is an impossibility ; but, as we have already seen, the tissues are not so formed in the beginning.

Let us consider the question from still another stand-point. The dentine of adult teeth may be said to contain from seventy to seventy-two per cent. and the enamel from ninety-six to ninety-eight per cent. of mineral matter, principally phosphate of lime. The appearance of embryonal elements in enamel or dentine means not only the liquefaction, but, to a great extent at least, the decalcification of these tissues. We might very pertinently inquire how this delicate matrix of living matter, constituting in enamel but three per cent. of the tissue, can be made to fill these decalcified tracts. It is asking quite too much of a tissue which it is doubtful if the most delicate methods of decalcification can discover. In an illustration accompanying one of Dr. Abbott's papers, the region of enlarged canaliculi, which enlarged canaliculi are represented as filled with nucleated bioplasson bodies, and the statement that they are nucleated means that the living matter has undergone a complete re-organisation, corresponds exactly with the infected region of Dr. Miller. The enlarged canaliculi are everywhere filled with micro-organisms, which destroy the living matter as fast as the acids effect the removal of the lime-salts, thus giving it no opportunity to be re-organised into medullary corpuscles. In fact, these micro-organisms, in destroying or digesting the living matter, effect this enlargement of the canaliculi, and it is these enlarged canaliculi, filled with micro-organisms, and *débris*, that Dr. Abbott has mistaken for fields of nucleated bioplasson and medullary corpuscles.

Gentlemen, the demonstration is under the microscopes ; examine the specimens for yourselves. But keep in mind the fact that I rest my case upon the evidence shown in the development of the teeth. This evidence I regard as conclusive and impregnable. To recapitulate, then, the points against Drs. Heitzmann and Abbott :

1st. In the formation of dentine there is never to be seen any evidence of the coalescing of odontoblasts or dentine corpuscles.

2nd. There is never to be seen any indication of partially calcified corpuscles; on the contrary, the line which separates the forming dentine from the odontoblasts is always strongly marked, and these tissues are affected by staining agents in an entirely different manner.

3rd. There is not uniformity in the branching of the fibrillæ, this peculiarity being much more strongly marked at their terminal points than in the deeper parts of the dentine.

4th. The dentinal fibrillæ are processes of the odontoblasts, and are continuous, passing from these bodies through the entire thickness of the dentine without break in their continuity.

5th. There is no perceptible material change in the appearance of the odontoblasts, from the commencement until the completion of the formation of the dentine, except that they seem to decrease slightly in size as the process of dentinification approaches completion.

6th. The microscopic evidences that enamel is not formed by a calcification of successive layers of corpuscles are more clearly shown than in the formation of dentine, there being never but a single layer of ameloblasts outside the forming enamel, and the line which separates the enamel from the enamel-formers being more sharply marked than in dentine.

7th. The method of the development of enamel and the microscopic morphology of the fully-formed tissue precludes the possibility of the existence of enamel-fibres in the sense taught by Drs. Heitzmann, Bödecker, and Abbott.

8th. The demonstrations upon which the foregoing propositions are based, and the evidences furnished by a careful microscopic study of caries of dentine and enamel, lead to the conclusion that the so-called inflammatory theory of decay has grown out of errors of interpretation, and is without foundation in fact.

In conclusion, I may repeat that the deductions to be drawn from my studies of the development and minute anatomy of the teeth in health and disease are in harmony with that practical experience, gained by careful observation, that decreased liability of the teeth to decay must result largely from change in environment; and this is to be effected by cleanliness, local antiseptic treatment by suitable mouth-washes, by giving the teeth a proper amount of work to do, and by such systemic treatment as will decrease the conditions which favour fermentation in the mouth.—*Dental Cosmos.*

Dental News.

MEETING OF THE BRITISH DENTAL ASSOCIATION.

The Annual Meeting was held in the School of Mines Jermyn Street, as well as at the Dental Hospital, Leicester Square, on the 19th, 20th, 21st ults. Proceedings commenced by a meeting of the Representative Board on the Thursday. The Presidential address was not delivered owing to the illness of Mr. Richard White, so Sir John Tomes occupied the chair, and addressed the association.

Sir Edwin Saunders F.R.C.S., the President elect subsequently took the chair, and delivered the address.

The following papers were read ; Mr. Smith-Turner being in the chair :—

"On Dental Education," by Mr. Morton Smale, M.R.C.S., L.D.S., L.S.A.

"A Simple Method of Photo Micrography, suitable for the delineation of dental and other tissues," by T. Charters White, M.R.C.S., L.D.S.

"On treatment of Alveolar Abscess," by W. Grayston, Esq., L.D.S.I.

"Dentistry and its Relation to the State," by Geo. Cunninghams Esq., D.M.D.

"Compulsory Attention to the teeth of School Children," 2nd paper, by W. M. Fisher, Esq., L.D.S. Eng.

"Public Appointments in relation to Dental Surgeons and the methods in which they are conferred," by W. G. Gordon Jones, L.D.S.I.

The following Demonstrations were given on the Friday.

Gold Filling Non-cohesive, by J. Ackery, Esq., M.R.C.S., L.D.S.Eng.
" by the Herbst Method, by W. Storer Bennett, Esq., F.R.C.S., L.R.C.P.Lond., L.D.S.Eng.
" by W. St. George Elliott, Esq., M.D., D.D.S.
" with Electric Mallet, by E. Latchmore, Esq., L.D.S.Eng.
" with tin combined, by Robert H. Woodhouse, Esq., M.R.C.S., L.D.S. Eng.

And the annual dinner of the Association under the presidency of Sir Edwin Saunders was held at The Criterion ; when Professor John Marshall, Mr. Septimus Sibley, and other distinguished guests were present. Various social gatherings were held. Upon the whole the annual meeting may be considered as having been a success, for which the active and courteous secretaries were much to be thanked.

CONVERSAZIONE GIVEN BY THE ODONTOLOGICAL SOCIETY.—The President and council of this society honoured the members of the British Dental Association by invitations to a conversazione in the Medical Society's rooms, Chandos Street. The invitation was pretty generally accepted, and, thanks to the admirable arrangements, a most successful and pleasant evening was spent. The artillery band was in attendance, and played with great vigour. Some excellent solos by Messrs. Fairbank, Hepburn, Smith were given, as well as several melodious glees. Recitations varied the programme,and concluded an exceptionally agreeable evening. We wonder if any of the many guests who availed themselves of the President and Council's invitation, realised the enormous amount of work and careful painstaking elaboration an evening like that involves upon the secretaries. If so, we hope they were additionaliy grateful.

TEETH INSERTED GRATIS.—A correspondent favours us with the following cutting :—“ A farmer in Kent advises strangers, if they wish to get teeth inserted gratis, to go and steal fruit where his watchdog is on guard.”

MARRIAGE.—On August 10th, at St. Leonard's, Streatham, Harry L. Pillan, L.D.S., Eng., of 33, George Street, Hanover Square, to Sallie, only daughter of H. J. Brown, Esq., of the “ Lindens ” Manor Park, Streatham. Mr. Harry L. Pillan was formerly H. S. to London Dental Hospital.

APPOINTMENTS.

Leonard Matheson, L.D.S., Eng., has been appointed Assistant Dental Surgeon to the Dental Hospital of London.

Mr. Alfred Prager, L.D.S.I., has been appointed Honorary Consulting Dentist to the Pimlico Road Free Dispensary.

Correspondence.

To the Editor of the "British Journal of Dental Science."

MR. HARDMAN ON AMALGAMS.

Sir,—It is curious to find anyone professing to have a knowledge of amalgams, expressing his opinion of the uselessness of platinum, so many years after the use and properties of this metal has been so clearly defined. Mr. Hardman may easily fail to find the use of platinum if he mixes his amalgams soft to make them set slowly and disturbs them whilst setting. The use of platinum is to determine a very definite hardening of any alloy containing silver and mercury, this setting or hardening process being quick. If the amalgam is disturbed or worked after the peculiar action of platinum is over, the result is, if anything, worse than if the platinum is not present, and no doubt this is the reason Mr. Hardman failed to find its value.—Your obedient servant,

THOS. FLETCHER, F.C.S.

Warrington.

Monthly Statement of operations performed at the London Dental Hospital, Leicester Square, from July 1st to 31st, 1886 :—

Number of Patients attended		2723
Extractions	Children under 14	393
	Adults	1171
	Under Nitrous Oxide	708
Gold Stoppings		320
Other Stoppings		808
Advice and Scaling		132
Irregularities of the Teeth		138
Miscellaneous		355
Total		4025

Chas. F. Rilot,
House Surgeon.

British Journal of Dental Science.

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SOME NOTES UPON DISINFECTANTS AND GERMICIDES.—I. (*Continued.*)

By Dudley Wilmot Buxton, M.D.; B.S. Lond., M.R.C.P.; Assistant to the Professor of Medicine in University College, London; Administrator of Anæsthetics in University College Hospital, the London Dental, and other Hospitals.

It will be well, before we enter upon the question of the specific activities of the above-mentioned disinfectant materials, to take a rapid survey of the germs upon which they are supposed to act. As it will readily be understood, this survey will be one far from exhaustive, and will, in the main, include only such organisms as are found in and about the oral cavity. The exhaustive studies of Cohn, Pasteur, Koch, Burdon Sanderson, and Klein must be consulted by those who desire to dip beneath the surface; and the report on septic bacteria, prepared by Professor Horsley, for the Local Government Board, will further supply a careful collaboration up to a recent date.

Micrococci, the small, spherical, highly refracting bodies, are divided into

(*a*) Septic.
(*b*) Zymogenic.
(*c*) Chromogenic.
(*d*) Pathogenic.

Septic micrococci are found in decomposing organic matters; they occur in solids or in fluids. Included under this heading are a very large number of organisms, which are distinguishable by their varying in size, and also as to their modes of growth differ. Thus, some elongate, and, becoming pinched in the middle, and at the two extremities start life as new individuals; or, again, a transverse division may occur. Some exist in isolation; many pass into an associated condition, forming necklace-like chains, colonies, or curious little masses.

The air teems with such forms, which are ready to grow and multiply should they become deposited in any situation where decomposition of organic material is occurring. In dead tissues they abound, and are readily recognised in the human mouth, even under so-called normal conditions. Pus swarms with these micrococci, whose presence is readily demonstrated in it.

One fact about them may be noticed in relation with their presence in the oral cavity, and that is, that all micrococci are encased in a thin crust of cellulose, a material which preserves them from the action of acids or alkalies, and hence protects them from the normal and diseased secretions of the mouth. In all mouths, and more especially in those of persons who neglect brushing their teeth with soft, long-bristled brushes, and careful oral ablution after food, contain the remains of food, which, even independently of diseased teeth provide a nisus for the growth and development of septic bacteria.

The zymogenic micrococci are of less immediate interest to us in the present connection. They are found active in various processes of a chemical nature, such as the fermentation of urine, etc.

The chromogenic micrococci are classified according to the colour they produce. They exist on boiled albumen and materials of the albuminoid class. Among colour-producing micrococci, the sarcinæ ventriculi are, perhaps, the best known. They are present in the stomach alike in health and disease, and are conspicuous in vomit. Their well-known form—not unlike a bale of jute tied across and across, so as to appear divided into four segments—is familiar to all microscopists.

Pathogenic Micrococci.

In abscesses, and especially in wounds freely open to the contaminating agency of the atmosphere, are found various forms of pathogenic micrococci. In fistulæ, abscess cavities in the mouth, cheek, tonsils, retropharyngeal tissues, etc., we have situations which swarm with organisms. They sometimes exist in masses of shining dots, called zoogl&oelig;a, sometimes in little chains, but often also singly, or they may assume the shape of tiny dumb-bells. It may be mentioned that inflammations, when of a purulent character, and invading connective or parenchymatous tissues, are found to have micrococci in their advancing borders in most cases when the central abscesses contained the micro-organisms.

Klein,* however, says, " Whether this spreading of the micrococci is merely of secondary importance, *i.e.*, concomitant with, or subsequent to, the spreading of the inflmamation, or whether it is the primary cause, as some assume, is not clear."

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* Micro-organisms and Diseases.

Whenever dead tissue exists in the organism, there are found micrococci, so that the exfoliation, whether of dead epithelium of the oral cavity, or of bone, as from a diseased jaw or antrum, will be accompanied by invasion of micrococci.

The saliva, the mucus of the nasal and oral cavities, pharynx, and larynx contain vast numbers of micrococci, which Klein suggests are derived from the atmosphere. Butlin *has shown that the fine papillæ of the tongue —*papilæ filiformes*—are frequently completely invested by masses of this minute organism. The exact nature of these mouth micro-organisms seems at present vague, for some observers have found that inoculations made with saliva from apparently normal individuals have produced death in rabbits ; the fatal result being, according to Sternburg,due to the micrococci, which initiate a septicæmic condition. Pasteur, as is well known, believes that a *microbe speciale* exists in hydrophobia, which is capable of cultivation, and which, through continuous cultivation, loses much of its virulency, and, upon being inoculated, produces a modified rabies which protects from the true disease.

Micrococci, considered to stand in specific relation to the disease are stated to be found associated with smallpox, cowpox, erysipelas, diphtheria, pneumonia, gonorrhœa, endocarditis, scarlatina, syphilis, rinder pest (cattle plague) and various other less known disorders.

From micrococci we pass to bacteria. These microparasites are elongated and rather oval (Cohn) or cylindrical, short, and with their ends rounded off. They move about of their own accord, being invested with a minute whip-like process, which may be single or project from either end. The mode of propagation is by a constriction taking place at the middle ; this increasing, the organism finally divides into two. Bacteria occur singly or in colonies, and are classed into two divisions, Bacterium termo, and Bacterium lineola, Of these the Bacterium termo is found in putrefying fluids, and by some is stated to be the cause, or ferment, of decomposition, the true saprogenous ferment of Cohn (Klein).

Bacterium lineola occurs largely in well and other waters, even when no putrefaction is present.

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* "Fur of the tongue," Proceedings of Royal Society. 1880.

Two varieties of zymogenic bacteria are known—bacterium lactis, and bacterium aceti; they respectively constitute the exciting cause of the lactic acid and acetic acid fermentations.

Just as we found colour-producing micrococci, we have pigment-bacterium, but they are not of special interest to us in our present remarks.

The pathogenic bacteria are of far more importance, although not for the immediate objects of the present paper. There exist three known forms, all capable of producing an intensely virulent variety of sepiticœmia.

Passing to bacilli, we have to consider organisms resembling bacteria in being cylindrical, or rod-like, and with round extremities, and differing in the fact that they are longer in proportion to the breadth than are bacteria. They are commonly met with in straight or wavy chains, composed of a number of bacilli (leptothrix,) lying end to end. Bacilli exist in very many varieties, differing in size, shape, power of locomotion, and also in length and thickness of their elements. Bacilli propagate by spores, and in this respect differ from bacteria; and a point of interest about these spores is, the great difficulty there is in destroying them.

Thus, while the bacilli themselves are killed by the temperature of boiling water, their spores are unaffected; freezing kills the bacilli, but not their spores. Antiseptics also which are able to destroy bacilli, fail entirely when used with the view of rendering the spores harmless. This fact readily commends itself to us in considering these bodies, as one is called upon not only to render harmless the fully developed bacillus, but also its spore; and hence it becomes incumbent upon us to decide what antiseptics will most readily accomplish this purpose. The structure of the spore has a great deal to do with its power of resisting heat, cold, acids, etc., as it possesses a kind of double coat, an internal which, according to Klein, is of a fatty nature, and an external described by the same authority as being composed of cellulose.

Among bacilli, the one which more especially interests us is the leptothrix buccalis, but it will be well to glance cursorily at some other forms.

The Septic Bacilli.

Bacillus sublilis is very widely distributed; existing in the air (as spores), and situations in which nitrogenous materials are undergoing putrefaction.

Bacillus ulna (Cohn), a variety very like the last named.

This kind is found in putrid fluids, in the ichor from sloughing, necrobistic tissues.

The bacillus septicus found in earth, putrid blood, in decomposing albuminous fluids.

The streptothrix and cladothrix, found by Cohn in the human lacrimal canal. They resemble the lepto thrixbuccalis, but are finer.

The zymogenic bacilli are more likely to be found in the buccal cavity, than any of the septic bacilli. The bacillus butyricus, which, according to Klein, resembles the bacillus sublilis in many respects, possesses the power of imitating butyric acid fermentation in solutions containing dextrin, starch, or sugar ; it is the active agent in producing butyric acid in ripening cheese.

Among the pathogenic bacilli we must notice a few varieties. That of septicœmia is described by Klein as being minute, and resembling the better known forms found in the septicœmia of mice. Arloing and Chauveau have found the same form of bacillus in gangrenous patches, and they attribute the gangrene to the presence of this micro-organism. In typhoid fever, in malaria, and in the poisoning due to putrid meat, we find bacilli, which are held by many to be pathognomic of the conditions.

The bacillus of anthrax claims a passing notice. In Woolsorters' disease, these organisms are found in vast numbers alike in the blood and tissues. They are comparatively large, form leptothrix, and propagate with extraordinary rapidity. Anthrax itself, a disease of rodents, infects man by the spores being inhaled or inoculated into a wound or scratch.

The bacillus of tuberculosis is a micro-organism of especial interest. It not only is usually accepted as the *fons et origo* of tuberculosis, but occurs tolerably frequently in the mouth in tubercular ulcerations of the tongue, or ejected from a similar pathological condition of the larynx. This bacillus is non-motile, and is capable of forming spores. These spores resist heat or cold, and hence human phthisical spritum remains actively virulent for a considerable length of time. Bacilli, quite similar, if not indistinguishable, to these, are found in so-called scrofulous inflammations, and also in licpus.

Among the spirillum class there are few organisms which are of importance in the present connection ; they are all rod-like, but bent. Vibriones are found in decaying organic matter. Other forms exist in pond-water; while among the pathogenic varieties, the spirillum obermeyeri is associated with relapsing fever. The next classes of micro-parasites interest us more nearly: these are the yeast fungi, the moulds, etc.

A CASE OF OSSIFYING FIBROMA OF THE SUPERIOR MAXILLA.*

By M. Richet.

The patient I shall now bring before you, is a man on whom I operated a few days ago for a fibroma of the upper maxilla—as I had correctly diagnosed, a fibroma, not an enchondroma or a myeloplastic tumour.

This fibroma was also accompanied with a considerable hyperostosis of the bone, not an exostosis, for the swelling of the maxilla was not limited and localised in one portion of the bone, as in a case of exostosis, but it involved the whole of the maxilla.

The tumour was thus formed by a layer of fibrous tissue, one centimetre thick. A special feature about it was that the fibrous tissue dipped into one of the alveoli from which the tooth had been removed. At first sight this tissue might have been taken for cartilage; it had the very look and transparency of it, but a microscopical examination of it showed it to be of a fibrous nature.

To sum up: we had to deal with a fibrous tumour surrounding the alveolar border of the superior maxilla; in other words, with an ossifying fibroma.

During the operation, I was taken by surprise by a few difficulties, which I was all the less prepared for, that the history I had received of the patient represented him to be a very sober person, very regular in his habits; whereas, as a matter of fact, he was a very hard drinker, and regularly saturated with alcohol. Thus, during the first stage of anæsthesia, his teeth were so tightly clenched that we were obliged to use a lever to open his mouth, and to place a piece of wood between his teeth, in order to keep his jaws apart. His face was scarlet and shining, his lungs congested, and at one moment the blood poured from all the small arterioles which were open. I was able, however, to remove the whole of the maxilla, with the pterygoid process, without any further mishap.

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* Reports of cases at the Hotel Dieu, of Paris.

In the course of the next day the patient had another fearful attack of hæmorrhage. He has been getting on better since, and I am beginning to hope for a steady and rather rapid recovery.

TUMOURS OF THE SUPERIOR MAXILLA.*

Dr. Berger reported on the paper by M. Jeannel on two cases of tumours of the upper maxilla. In the first, a man of fifty, he had to deal with a cartilaginous tumour of rather rapid growth, which was very hard and quite movable on the right upper maxilla. It was removed, but recurred again the following year. M. Jeannel now excised a large portion of the superior maxilla. Two months afterwards, the growth appeared again in the roof of the palate. It was now necessary to perform a radical operation in the excision of the left upper maxilla. The growth recurred again, but the patient refused to submit to any further operation. A microscopical examination had, however, shown the growth to be a hyaline chondroma. In a former report on a case operated by M. Kirmisson, M. Berger had already drawn attention to the relative frequency of recurrence of chondroma of the jaw. The explanation of this fact may possibly be found in the abundance of cells in these chondromota. The conclusion to be drawn from these facts is, that in a case of a cartilaginous tumour of the upper maxilla, the whole of the bone should be removed.

The second case related by M. Jeannel is quite unique; it is that of a dermoid cyst of the upper maxilla. The patient was a man aged forty-two, who had a swelling of the left upper maxilla ; a small granulation formed on a level with the incisor, which, on being cut into by M. Jeannel, gave issue to some cheesy matter ; on careful examination, M. Jeannel was able to discover several fistulous tracts all leading to a single cavity. He thereupon removed the whole tumour ; he soon, however, discovered minute white points on the neighbouring alveoli, which became the seat of a recurrence of the growth. On being examined with the microscope the tumour turned out to be a dermoid cyst. Dr. Berger made a few remarks on the pathology of these cysts, and dwelt especially on the theories of inclusion, and of the abnormal development of paradental elements. Dr. Berger agreed in this respect with M. Malassey, and would be rather inclined to look upon the mass as an epithelioma rather than a dermoid cyst.

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*Read before the Société de Chirurgie of Paris, 21st July, 1886.

M. Terrier said that it would appear from M. Jeannel's first case, that enchondromata must be removed by a very free operation, a fact that has been shown over and over again ; M. Jeannel therefore made a mistake in performing such incomplete operations. The second case might very likely be one of actinomycosis, an affection which has been quite recently described in Germany. In this respect the relation of M. Jeannel's second case is altogether incomplete.

M. Tillana can hardly believe that the second case was one of dermoid cyst he would rather incline to the view of its being an epithelioma of the alveolar border ; the precursory pains, the recurrence and aspect of the tumour all tended to that view of the case ; he believed it to be a case of central epithelioma of the edge of the alveolar arch.

M. Kirmisson proposed to ask for further information ; it would be interesting to know the further history of the case. But, *prima facie*, he was not prepared to look upon the tumour as a dermoid cyst he inclined towards the diagnosis, an epithelioma rather than actinomycosis.

M. Berger believed it would have been preferable to remove the whole of the bone in the first instance, but he was nevertheless certain that on each occasion M. Jeannel had removed all the affected tissue. With regard to the second case, he did not believe it could be looked upon as one of actinomycosis. M. Malassey having examined the supposed case of epithelioma, gave it as his opinion that it was a dermoid cyst ; M. Berger relied upon this eminent histologist's opinion.

British Journal of Dental Science.

LONDON, SEPTEMBER 15, 1886.

THE STUDENT'S CAREER.

Perhaps in no calling can an efficient man make a comfortable competence more certainly than in that of the dentist. The well-qualified student, fresh from the hospital, will, if he has distinguished himself during his student's career, be certain to find some opening for his abilities and talents. He, in many cases, finds a busy senior anxious for an assistant, and then receives an income upon which he can live comfortably and save. Such a connection is sure, in most cases, to lead to a partnership, which, in course of time, means a lucrative and certain source of income.

But what are the requisites for securing so desirable a consummation?

The dental student, after his three years of apprenticeship to the mechanical part of his calling, enters upon his hospital course. During his preparation for the strictly professional part of the examinations for the L.D.S., the student is usually left much to his own devices. If he is a sharp lad he soon discovers that for mere prize-taking—or, be he less ambitious, for a bare scraping through his class examinations

—he need not work all through the session: a spurt put on a few weeks before the end of the session will land him upon his feet. He accordingly relies on this, and lazies away his time over his particular whim—it may be beer and billiards, music-halls and *coryphées*, or, worst of all, it may be downright doing nothing. The curse of students—the drink-fiend —does not, as a rule, assert its dire ascendancy until a later stage of the downward journey; it is the result of ill companions, an only half-killed conscience, and an empty pocket. All these tempters of the student left alone in London may, of course, be worsted by the inherent steadiness and pluck of the boy himself; but, as a rule, a career begun in idling and profligacy ends in the same lines, and the whole life is useless alike to the man himself and to his fellows. It is futile to bemoan the temptations and to read diatribes against evil communications; facts must be faced and evils met by timely precaution and watchful care.

By far the largest number of young men who do "go to the dogs," as the euphemistic saying runs, are driven there by the short-sighted policy of their natural guardians, their mothers and fathers. High-spirited boys, brought up in the country, petted and spoiled, and accustomed to win their own way by their very wilfulness, are suddenly transported from a comfortable home to a strange town, where novelty invests the commonplace with a glamour irresistible to the inexperienced. The boy, even though well-meaning enough, is thrown entirely upon his own resources, and almost certainly lapses, even without being aware of what he is doing. The first step taken, the others come easily enough; and the hurly-burly of vice is entered, to be quitted hardly, and after much suffering and distress.

To avoid this—usually the starting-point of a student's downward course—two courses are open. Assuming the boy's parents are not resident in London, they may place him in one of the now numerous colleges or halls built to give residence to medical students, or they can commit him into the hands of a professional man, with whom to live.

The collegiate system has some advantages, but since there is, as far as we know, no institution devoted solely to the interests of dental students, it is probable that it is a better and safer plan to place boys with professional men.

In adopting this course, however, care and discretion are needed. Many doctors take boys for small sums, and, instead of promoting the boys' well-being by directing their studies and urging them on to win a creditable position in the hospitals and class-rooms, they compel them to do a kind of medical "fagging." Night midwifery, paupers' medicine, are handed over to the unhappy student, who has to get through the matter with as little danger to his patient, his employer, and himself as circumstances will allow. Such cases occur less among dental than among purely medical students, but parallel instances do unhappily exist among dentists.

The Apprenticeship, lasting three years, must be completed before hospital work or lectures count.

The youth who proposes to adopt dentistry as his life's pursuit, must pass through the chrysalis stage of apprenticeship before he enters upon his hospital career. During these three years, the student is expected to perfect himself in the mechanical department of his calling. The premium which is asked for and paid to dentists for signing indentures for pupils varies largely. In many cases the lowest bid is in reality far from the cheapest. Of all things it is *most important* that the apprenticehood shall be successful. To ensure this, many things about the dentist to whom the lad is apprenticed, are essential.

Besides being a skilled mechanical dentist himself, he must be able to impart his knowledge to others. Many men think their duties extend only just so far as the providing opportunities for the boys in their work-rooms to see the work done ; they assume the apprentice can (save the mark !) pick up the practice and skill by themselves ; and so it happens that many a lad passes through his three years with as little knowledge or skill sticking to him, as he might acquire in passing through two or three dental factories. Again, the very busy men have little time for their pupils, and hence these last are committed to the workmen, and not unfrequently learn much besides professional matters, and are not greatly benefited by their acquisition. During the term of his apprenticeship, the student ought to live in the house of a professional man; his reading and general comportment will thus be supervised, while the dentist to whom he is apprenticed can keep an eye upon his progress in the work-room. The great importance of this will appear evident when we remember that the habits formed during these three years of apprenticeship, whether for good or bad, will pretty surely persist throughout the after career. It is sometimes asked, Is not three whole years too much time to devote to purely mechanical work? And to this we answer, Three years is all too little if properly spent; and nine lads out of ten will find little time to spare—that is, of course, if they throw themselves properly into their work.

Examinations.

The Preliminary Examination.—Until this is passed, student life cannot be said to have commenced. As it is by no means a matter of indifference which examination is selected, we will specify the reasons for selecting one of the higher standard tests.

The various qualifying examinations are mentioned on page 839 of this issue, so that recapitulation is unneeded. Unless the student has graduated at Oxford or Cambridge, it is desirable that he should pass the matriculation examination at the University of London. This examination ensures a fair knowledge of classics, mathematics, modern languages, and physics and chemistry, and should not be beyond the reach of any intelligent boy who has received a good schooling. Having passed it, the student may, should he so desire, work on for the London M.B. degree, the preliminary scientific examination for which he might pass during his apprenticeship. The matriculation will cover preliminary tests for the membership and fellowship of the Royal College of Surgeons of England.

The other examinations vary much in "stiffness," some being very easy, others requiring considerable effort. However, the extra labour expended on passing a high standard examination is amply repaid in the end.

The Professional Examinations.—It is impossible in this place to enter into detail upon these examinations, as they differ considerably, according as the student qualifies in England, or Scotland, or Ireland. It is best for English students to take the L.D.S. of the Royal College of Surgeons of England. When time is available it is of great advantage for the student to possess himself of a qualification in surgery ; this he can do after taking the L.D.S.

THE HOSPITAL CAREER.

Students are required to have completed four years of professional study subsequent to registration. Attendance at a General Hospital and Medical School is compulsory for two winter and one summer session, as well as two years' attendance at a Dental Hospital and Medical School. The work at the General and Dental hospitals and schools may be taken simultaneously. Should the student wish to take a surgical diploma, he will be required to attend more lectures and to enter for four years at a general hospital. He will then pass his first professional examinations in anatomy, physiology, etc., and leave his final M.R.C.S. until he has completed his dental curriculum, and obtained the diploma in dental surgery.

We have already pointed out the very great importance of placing the student with some practitioner during his hospital career. We have yet to dwell upon the very great importance of his steady work and industry during this period of his career. What most youths lack is steady, continuous work ; it is the daily application which will, in the long rnu, secure the best places in classes and the scholarships. And it is a vast mistake to underrate the value of either class prizes or scholarships. They possess a value quite above the mere pecuniary income they provide ; they bring the student before his teachers ; they make him a marked man for good ; and, sooner or later, he will find himself occupying the much-coveted post of House Surgeon. This in its turn leads to other posts, and it may be, in the dim distance, a vacancy in the staff of his hospital falls to the lot of the student who made the most of his hospital career.

Synopsis of the Student's Career.

I. Preliminary Examination. See page 839-41.

II. Registration as a dental and as a medical student.

This is effected by going to the office of the Medical Council, 299, Oxford Street, London, W.

⁂ Students who commenced their professional education by apprenticeship to Dentists entitled to be registered, or by attendance upon professional lectures, before July 22nd, 1878 (when Dental education became compulsory), shall not be required to produce evidence of having passed a Preliminary Examination.

III. Apprenticeship—Instruction in mechanical dentistry by a duly qualified registered practitioner for three years.

IV. Entrance upon professional studies simultaneously at a general and dental hospital, with attendance upon lectures.

⁂ See regulations of the various licensing bodies.

DEATH OF DR. WAKLEY.—It is with profound regret that we chronicle the death of the accomplished editor of our contemporary, the *Lancet*. Few men, perhaps fewer editors, have won so completely the good-will and esteem of that section of society which they represent as did Mr. Wakley. And far outside the precincts of the profession of medicine was he respected and his good influence felt. Dr. Wakley accomplished very much for all branches of the profession; not least for dentistry; and all alike will mourn the loss of so able and kindly-natured a man.

A RESIDENTIAL college is about to be erected for the students of the Middlesex Hospital. A need of such an institution has been felt for some time, and it is now hoped that the present effort will prove successful in every way.

Abstracts of British & Foreign Journals.

DENTAL COSMOS.

ON THE LINING OF CAVITIES.

By A. B. Harrower, D.D.S., Philadelphia, Pa.

The use of the four filling materials—gold, amalgam, gutta-percha, and zinc-phosphate—produces evils which the writer thinks go far to abrogate the good arising from closure of the cavity of decay and restoration of contour. These consist of discolouration of tooth-structure, pulp irritation, and the loss of fillings—either through their resting upon an unstable foundation, the recurrence of decay, or the fracture of frail walls.

Discolouration may arise from infiltration of the oral fluids after the insertion of a filling of gold or amalgam, which is leaky through inefficient manipulation, or gutta-percha, which is leaky no matter how well introduced. In the case of amalgam, the metallic salts stain the dentine; or the character of the dentine itself may cause it; and, lastly, it may be consequent upon recurring decay.

Pulp irritation follows thermal shocks, transmitted by metallic fillings, and this irritation may ultimately cause congestion and death of the pulp. Oxychloride of zinc may cause severe irritation, necessitating removal of both fillings and linings of that material. The injudicious use of filling materials containing phosphoric acid may cause pulp trouble.

The loss of fillings through insecure foundations occurs where a firm base cannot be obtained by excavation without producing undesirable results—such as the too close approximation of filling and pulp, the material to be introduced possessing no adherent properties, or when it cannot be inserted without a dangerous amount of pressure.

By loss of fillings by recurring decay is intended to apply only to those cases in which the situation of the cavity compels the use of materials not in harmony with tooth-structure—namely, gold and amalgam.

The loss from breakage of frail walls often results from the want of adhesion possessed by the filling.

These evils may be largely obviated by judicious "lining," the materials available being varnish and the various zinc plastics—namely, the oxychloride, oxysulphate, oxyphosphate, and nitro-phosphate of zinc, and in one set of cases gutta-percha in its various forms.

The materials used for lining-varnishes comprise sandarac, copal, shellac, inspissated Canada balsam, mastic, etc.; these being dissolved in ether, chloroform, absolute or methylic alcohol. Of these, absolute alcohol is the most satisfactory; there, though a rapid dryer, produces a greater degree of cold than the alcohols, and has an unpleasant odour. Methylic alcohol also smells, while chloroform dries almost as rapidly as ether, and its use is not without risk.

Sandarac is probably the best of these. It is easily soluble in alcohol, hardens with sufficient rapidity, makes a strong varnish, and leaves on drying an opaque, whitish film.

The following is the formula usually employed :

Selected sandarac-tears	3 grs.
Alcohol	1 dr.

Gum damar has been introduced as a lining-varnish ; it resists the action of water, forms a tough film. The proper consistence is obtained by dissolving in hot alcohol as much of the gum as it will take up. The solution is allowed to cool and settle, and the clear portion carefully decanted. This varnish leaves, on drying, a strong, tenacious film. Although superior to sandarac in these ways, it lacks opacity—the latter quality being a very desirable one in lining those cavities in front teeth wherein the walls are transparent and other linings contra-indicated. By mixing the two varnishes a new one is obtained, combining the good qualities of both. The proportions may be varied to meet the indications, but a varnish of equal parts of each is most useful.

No. 1.	Sandaric varnish Damar varnish	equal parts.
No. 2.	Sandaric varnish	2 parts.
	Damar varnish	1 part.

As will be seen from the preceding formulas, the effect of varnish-lining is, to leave upon the cavity-walls a thin, semi, opaque, whitish film, which is non-conducting, non-irritating-insoluble, impervious to moisture, and more nearly in harmony with dentine than any metallic substance.

The action of such a film in preventing discolouration consists—1stly, an opaque material is introduced, which obscures the colour of the filling when viewed through thin walls, and its own colour approaches that of the dentine ; 2ndly, in its hermetically sealing the dentinal tubuli, thereby preventing exudation ; 3rdly, in protecting the dentine from permeation by metallic salts or the products of leakage ; and 4thly, by retarding decay.

The operation of varnish-lining is described : The cavity, being properly excavated and guarded against the ingress of moisture, is carefully dried. A very small pellet of cotton is then taken by a pair of delicate pliers, dipped in the varnish, and conveyed to the cavity, when it is used as a brush to coat the walls. Five minutes for a plastic, ten for a gold filling, are allowed for hardening, and the cavity is filled. The film can be rendered harder in the same period of time by a *gentle* current of warm air, or the film may be dried by the hot air syringe. When a double lining is desired, a second coat of varnish is added five minutes after the introduction of the first. This second coat is indicated under amalgam in bicuspids, etc., and which it is desirable to effectually avoid.

In cavities with thin or frail walls, through which the colour of the filling would be seen, or need support, linings of oxychloride, oxyphosphate, or nitro-phosphate of zinc are indicated.

Oxychloride of zinc sets slowly, and is weaker and less adhesive than the phosphates. It shrinks if used *in bulk*, and so it is inferior to either of the phosphates as a *strengthener* of frail walls. It exercises a tonic influence upon dentine, inducing recalcification, and permits of no decay in contiguous tooth-structure ; it is easily manipulated.

Oxyphosphate of zinc sets slowly, does not shrink, and is adhesive ; it is stronger than oxychloride. It is a good liner where thin, frail walls need a material which shall afford direct support through its adhesion as well as through its inherent strength.

Nitro-phosphate of zinc sets quickly, is moderately adhesive, does not shrink or expand, and is strong. It is, therefore, peculiarly adapted for the support of frail walls, especially where they overhang, but is difficult of manipulation. These two latter materials have the smooth and tenacious plasticity which permits of their being placed in position with burnishers instead of cotton pellets, and of their being worked to a feather edge, of decided strength, at the margin of the cavity, and so are superior to oxychloride.

These phosphates possess the ability of devitalising the dental pulp, oxychloride does not. This dangerous property should always be borne in mind, and the pulp should be carefully protected. Even in *shallow* cavities a lining of varnish should precede the introduction of *any* material containing phosphoric acid.

Oxychloride darkens after use, so that a lighter colour should be selected than the adjacent teeth. A small portion is taken upon the point of the spatula and placed in position against the wall of the cavity. It is then "pelleted" accurately into place, and allowed to harden for from five minutes to several hours, according to the kind of filling which is to be inserted.

When used for a solid base to gold or amalgam, where it is desirable to leave a mass of *soft* dentine at the bottom of the cavity, or where pressure is likely to injure the pulp, this should be protected against the action of the chloride of zinc by *a thin shaving* of gutta-percha, adhesive plaster, double lining of varnish, or a stratum of oxysulphate of zinc. This being done, the oxychloride is mixed somewhat thicker than when used as a lining only, and the deeper portion of the cavity is filled up to the desired level. If an amalgam filling is to be introduced, the base should then be varnished, and permitted to harden for ten or fifteen minutes; but if a gold filling is called for, the remainder of the cavity should be filled with temporary stopping and allowed to set for a day or two.

The oxyphosphate and nitro-phosphate both possess decided strength, adhesiveness, and plasticity; the nitro-phosphate being superior in the former, and the oxyphosphate in the two latter respects. A greater degree of quickness in setting renders the nitro-phosphate much more difficult of manipulation, especially with those unaccustomed to its use; while the slowness of the oxyphosphate in this respect permits of much deliberation in working.

The phosphates, when used as *liners*, should be made somewhat thinner than when used as a filling. It is placed in position by the spatula, and worked into apposition with the cavity-walls by means of smooth-faced instruments previously touched to an oil-pad. The edges are then trimmed, and the material allowed to attain the requisite degree of hardness, after which the filling is introduced.

To recapitulate: Linings of varnish are indicated in all small cavities in the incisors, cuspids, and bicuspids where either gold, gutta-percha, or amalgam is to be used; under the phosphates where the cavity is superficial; and, in fact, in all cavities which can be kept dry, *except* where we wish to obtain the therapeutic effect of the filling material. Linings of oxychloride are indicated in cases of thin or discoloured walls, where there is decided tendency to decay; or where the dentine is soft, and we desire a therapeutic effect from the lining. In these cases there is nothing to equal oxychloride of zinc. The phosphates are indicated as linings where very thin, frail walls, or overhanging edges, demand a material which does not shrink as much as oxychloride, and which is more adhesive.

British Journal of Dental Science.

DENTAL STUDENTS' SUPPLEMENT.

SEPTEMBER 15, 1886.

1.—THE LICENSING CORPORATIONS.

COMPARATIVE SUMMARY OF REGULATIONS FOR THE LICENSE IN DENTAL SURGERY.

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons Ireland.*	Faculty of Physicians and Surgeons Glasgow.
1—PRELIMINARY EXAMINATION	Compulsory on all who commenced their Professional Education after July 22nd, 1878.	Compulsory on all who commenced their Professional Education after August 1st, 1878.	Compulsory on all, except in the case of the modified Examination, *vide infra*.	Compulsory on all who commenced their Professional Education after August 1st, 1878.
2—AGE at which the Candidate may present himself	Twenty-one.	Twenty-one.	Twenty-one.	Twenty-one.
3—DURATION OF PROFESSIONAL EDUCATION....	Four years.	Four years.	Four years.	Four years.
4—COURSES OF LECTURES, etc., to be attended at a recognised School:				
Anatomy................	Two Courses, or one Course and twenty Lectures on Head and Neck.	One Winter Course.	One course.	Two Courses, or one Course and twenty Lectures on Head and Neck.

Corrections not having been received from th , its accuracy cannot be guaranteed.

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
4—COURSES OF LECTURES, &c. (*continued*)—				
Physiology	One Course.	One Course of 50 Lectures.	One course.	One six months' Course.
Surgery	Ditto.	One Winter Course.	Ditto.	Ditto.
Medicine	Ditto.	Ditto.	None.	Ditto.
Chemistry	Ditto.	Ditto.	One Course.	Ditto
Materia Medica..........	One Course.	One three months' Course.	Ditto.	One three months' Course.
Dissections and Demonstrations, or		Nine months.	Two Courses.	Nine Months.
Dissections and	Nine months.	Nine months.		
Anatomy of Head and Neck		One Course of 20 Lectures.		
Practical Chemistry and Metallurgy	One Course of each.	One three months' Course.	One Course.	One three months' Course.
Practice of Surgery, and Clinical Lectures	Two Winter Sessions.	One six months' Course, or two three months' Courses.	Two Winter Sessions.	One year's.
Dental Anatomy and Physiology................	Two Courses..	One Course.	None.	Twenty-four lectures.
Dental Surgery	Ditto.	Ditto.	Two Courses.	Twenty Lectures.
Dental Mechanics	Ditto.	Ditto.		Twelve Lectures or Demonstrations.
Practical Instruction in Mechanical Dentistry ..	Three years under a competent Practitioner.	Three years under a Registered Dental Practitioner.	Three years under a Registered Dental Licentiate.	Three years under a Registered Practitioner.
Practice of Dental Surgery in a recognised Dental Hospital, or in the Dental Department of a recognised General Hospital..	Two years.	Two years.	Nine months.	Two years.
5—FEE	£10 10s. over and above stamp duty	£10 10s.	£10 10s.	£10 10s.
6—LEAST period during which unsuccessful Candidates are referred to their studies	Six months, subject to the decision of the Board.	Three months.	Six months.	Three months.

7—Particulars of Examination	(A) *Written* : On General Anatomy and Physiology. General Pathology and Surgery (both with especial reference to Dental Practice). (B) *Oral* : On all subjects in the Curriculum. Preparations, Casts, and Drawings. Fillings. Cases for Diagnosis, instruments, &c.	*Written and Oral* : First Part—Anatomy, Physiology, Chemistry, and Metallurgy. Second Part — Surgery, Medicine, Materia Medica, and Special Dental subjects.	*Written and Oral* : On all the subjects of the Curriculum. Preparations, Microscopes, and other appliances.	*Written, Oral, & Practical*: First Part—Anatomy, Physiology, Chemistry, and Metallurgy. Second Part—Surgery, Medicine, Materia Medica, and special Dental subjects. Practical Examination at a Dental Hospital. Candidates are to bring Excavators, Files, and Plugging instruments.
8—Date of Examination	February, June, and October.	First Part—1886. ,, Tuesday October 5. 1887 ,, January 4. ,, ,, April 19. ,, ,, July 19. Second Part — Following Thursday.	July and October.	1886—October 12—14. 1887—January 18—20. ,, April 26—28. ,, July 12—14.
9—Modified Conditions of Admission to Examinations *sine curriculo:* (*a*) Conditions of eligibility	Candidates must have been in Practice or have commenced Professional Educational prior to September, 1859 (the date of the Dental Charter)	Candidates must have been in Practice, before August 1st, 1878, or apprenticed before August 1st, 1875.	Candidates must be registered Dental Practitioners in practice, before 1878.	Candidates must be registered Dental Practitioners in Practice before August, 1878.
b) Certificates, &c. required	One of moral character signed by two members of the College or two Licentiates of the Licensing Bodies in the country where the education was received.	One of moral and professional character signed by two Registered Medical Practitioners.	Certificates of moral and professional character signed by two Registered Medical Practitioners and by two Registered Dentists.	Certificates of moral and professional character signed by two Registered Medical Practitioners. Also, declaration by the Candidate that he does not advertise.

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
9—MODIFIED EXAMINATIONS—(*contd.*) : (*b*) Certificates, &c. required (*continued*).	Name. Age. Professional address Date of commencing Dental practice.	Name in full. Age. Address. Date of commencing Dental practice or apprenticeship, and whether if in practice in conjunction with any other and what business.	Name. Age. Address. Date of commencing practice, and whether such practice has been carried on in conjunction with any other business, and if so with what business.	Name. Age. Address. Apprenticed how long, and to whom.
	Whether a Member, Licentiate or Graduate of any British College of Physicians, College of Surgeons, or University, with date of license, &c. Of what learned societies a Member.	Whether in possession of Degree or Diploma in Medicine or Surgery ; if so, what, and date.	Professional status.	Professional status.
	Whether in Dental practice separately, or if not, in connection with what business.	Whether practising Dentistry in conjunction with any other business, and if so what.		
	Whether he has employed Advertisements or Public Notice.			
	Particulars of Professional Education.	Particulars of Professional Education.	Particulars of Professional Education.	Particulars of Professional Education.
(*c*) Manner of Examination	Same as ordinary Examination.	Same as ordinary Examination.		Same as ordinary Examination
Fee	Ten guineas over and above stamp duty.	£10 10s.	£21.	£10 10s.
For further information apply to Secretary.	EDWARD TRIMMER, Esq., Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.	JOS. BELL, ESQ., F.R.C.S.E. 2, Melville Crescent, Edinburgh.	JOHN BRENNEN, Esq., Royal College of Surgeons, Dublin.	ALEX. DUNCAN, Esq., Faculty of Physicians and Surgeons, Glasgow.

II.—PRELIMINARY EXAMINATION.

REGULATIONS OF GENERAL MEDICAL COUNCIL.

No person shall be allowed to be registered as a Medical or Dental Student unless he shall have previously passed a Preliminary Education in the subjects of General Education as specified in the following list:—*

1. English Language, including Grammar and Composition.†
2. English History.
3. Modern Geography.
4. Latin, including Translation from the original, and Grammar.
5. Elements of Mathematics, comprising (*a*) Arithmetic, including Vulgar and Decimal Fractions; (*b*) Algebra, including Simple Equations; (*c*) Geometry, including the first two Books of Euclid, or the subject thereof
6. Elementary Mechanics of Solids and Fluids, comprising the Elements of Statics, Dynamics, and Hydrostatics.**
7. One of the following Optional Subjects:—
   (*a*) Greek; (*b*) French; (*c*) German; (*d*) Italian; (*e*) any other Modern Language; (*f*) Logic; (*g*) Botany; (*h*) Elementary Chemistry.

List of Examining Bodies whose Examinations fulfil the conditions of the Medical Council as regards preliminary education:—

I. UNIVERSITIES IN THE UNITED KINGDOM.

UNIVERSITY OF OXFORD:—

1. Junior Local Examinations; Certificate to include Latin and Mathematics, and also one of the following optional subjects:—
   Greek, French, German, Natural Philosophy, including Mechanics, Hydrostatics, and Pneumatics.
2. Senior Local Examinations; Certificate to include Latin and Mathematics.
3. Responsions.
4. Moderations.
5. Examination for a Degree in Arts.

UNIVERSITY OF CAMBRIDGE:—

6. Junior Local Examinations; Certificate to include Latin and Mathematics, and also one of the following optional subjects:—
   Greek, French, German, Natural Philosophy, including the Elements of Statics and Hydrostatics.

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* The Examinations in General Education conducted by Universities will be accepted as heretofore, but if in any of these Examinations the subjects of Elementary Mechanics of Solids and Fluids are not included, the Candidate must pass in one or other of the remaining optional subjects instead, and a knowledge of Elementary Mechanics will be required at a subsequent Examination.

† "The General Medical Council will not consider any Examination in English Language sufficient that does not fully test the ability of the Candidate:—(1) To write sentences in correct English on a given theme, attention being paid to spelling and punctuation as well as to composition;—(2) to write correctly from dictation;—(3) to explain all the grammatical construction of sentences;—(4) to point out the grammatical errors in sentences ungrammatically composed, and to explain their nature;—and (5) to give the derivation and definition of English words in common use."

** "This subject may be passed either as a preliminary, or before, or at the first Professional Examination."

7. Senior Local Examinations; Certificate to include Latin and Mathematics.
8. Higher Local Examinations.
9. Previous Examinations.
10. Examination for a Degree in Arts.

UNIVERSITY OF DURHAM:—

11. Junior Local Examination; Certificate to include Latin and Mathematics, and also one of the following optional subjects:—
    Greek, French, German, Natural Philosophy, including Mechanics, Hydrostatics, and Pneumatics.
12. Senior Local Examinations; Certificate to include Latin and Mathematics.
13. Registration Examination for Medical Students.
14. Examination for Students at the end of their first year.
15. Examination for a Degree in Arts.

UNIVERSITY OF LONDON:—

16. Matriculation Examination.
17. Preliminary Certificate (M.B.) Examination.
18. Examination for a Degree in Arts or Science.

UNIVERSITY OF EDINBURGH:—

19. Local Examination (Junior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—
    Greek, French, German, Natural Philosophy.
20. Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—
    Greek, French, German, Natural Philosophy.
21. Preliminary Examination for graduation in Science or Medicine and Surgery.
22. Examination for a Degree in Arts.

UNIVERSITY OF ABERDEEN:—

23. Local Examinations (Honours Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—
    Greek, French, German, Natural Philosophy.
24. Preliminary Examination for graduation in Medicine or Surgery.
25. Examination for a Degree in Arts.

UNIVERSITY OF GLASGOW:—

26. Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following subjects:—
    Greek, French, German, Natural Philosophy.
27. Preliminary Examination for Graduation in Medicine or Surgery
28. Examination for a Degree in Arts.

UNIVERSITY OF ST. ANDREW'S:—

29. Local Examinations (Honours Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following subjects:—
    Greek, French, German, Natural Philosophy.
30. Preliminary Examination for Graduation in Medicine or Surgery.
31. Examination for a Degree in Arts.

UNIVERSITY OF DUBLIN :—

32. Public Entrance Examination.
33. Examination for a Degree in Arts.

QUEEN'S UNIVERSITY IN IRELAND :—

34. Local Examination for Men and Women; Certificates to include all the subjects required by the General Medical Council.
35. Entrance or Matriculation Examination.
36. Previous examination for B.A. Degree.
37. Examination for a Degree in Arts.

ROYAL UNIVERSITY OF IRELAND.

39. *Certificate to include the following subjects :—
    (*a*) Arithmetic, including Vulgar and Decimal Fractions.
    (*b*) Algebra, including Simple Equations.
    (*c*) Geometry, including the first two Books of Euclid.
    (*d*) Latin, including Translation and Grammar.
    (*e*) Also one of these optional subjects :—
    Greek, French, German, Mechanical Division of Natural Philosophy.

VICTORIA UNIVERSITY :—

40. Preliminary Examination; Latin to be one of the Subjects.

II.—OTHER BODIES NAMED IN SCHEDULE (A) TO THE "MEDICAL ACT."

APOTHECARIES' SOCIETY OF LONDON :—

41. Examination in Arts.

ROYAL COLLEGE OF PHYSICIANS AND SURGEONS OF EDINBURGH :—

42. Preliminary (combined) Examination in General Education.

FACULTY OF PHYSICIANS AMD SURGEONS OF GLASGOW :—

43. Preliminary Examination in General Education.

ROYAL COLLEGE OF SURGEONS IN IRELAND :—

44 Preliminary Examination; Certificate to include Mathematics.

APOTHECARIES' HALL OF IRELAND :—

45. Preliminary Examination in General Education.

III.—EXAMINING BODIES IN THE UNITED KINGDOM NOT INCLUDED IN SCHEDULE (A) TO THE "MEDICAL ACT" (1858).

COLLEGE OF PRECEPTORS :—

46. Examination for a First Class Certificate, or Second Class Certificate of First or Second Division, Algebra, Geometry, Latin, and a modern Language, having been taken.

EXAMINERS FOR COMMISSIONS AND APPOINTMENTS IN HER MAJESTY'S SERVICE, MILITARY, NAVAL, AND CIVIL :—

47. Certificate to include all the subjects required.

INTERMEDIATE EDUCATION BOARD OF IRELAND :—

48. Junior Grade Examination	Certificates in each case to include all the subjects required
49. Middle ,, ,, ...	
50. Senior ,, ,, ...	

IV.—CERTAIN EXAMINATIONS OF INDIAN, COLONIAL AND FOREIGN UNIVERSITIES AND COLLEGES.

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* The *English* is provided for by the following *Resolution*, passed by the Executive Committee on October 27th, 1876 (*Minutes*, Vol. XIII., p. 358)—

"That as every candidate for the Certificate of the Oxford and Cambridge Schools' Examination Board is required to answer questions in such a manner as to satisfy the Examiners that he has an adequate knowledge of English Grammar and Orthography: this shall be held as conforming to the requirements of the Medical Council in reference to English Language."

III.—EDUCATIONAL BODIES.

LONDON.

DENTAL HOSPITAL OF LONDON, AND LONDON SCHOOL OF DENTAL SURGERY, LEICESTER SQUARE.

HOSPITAL STAFF.

Consulting Physician—Sir J. Risden Bennett, M.D., L.L.D., F.R.S.

Consulting Surgeon—Christopher Heath, F.R.C.S.

Consulting Dental Surgeons.

Samuel Cartwright, F.R.C.S. Sir John Tomes, F.R.S., F.R.C.S.

Dental Surgeons.

9 a.m.—	Monday......	David Hepburn, L.D.S.
,,	Tuesday......	R. H. Woodhouse, M.R.C.S., L.D.S.
,,	Wednesday ..	George Gregson, M.R.C.S., L.D.S.
,,	Thursday	Storer Bennett, L.R.C.P., F.R.C.S., L.D.S.
,,	Friday	Arthur Underwood, M.R.C.S., L.D.S.
,,	Saturday	F. Canton, L.R.C.P., M.R.C.S., L.D.S.

Assistant Dental Surgeons.

,,	Monday	Leonard Matheson. L.D.S.
,,	Tuesday	W. Hern, M.R.C.S., L.D.S.
,,	Wednesday ..	Claude Rogers, M.R.C.S., L.D.S., D.D.S.,U.S.
,,	Thursday	Geo. Parkinson, M.R.C.S., L.D.S.
,,	Friday	Lawrence Read, L.D.S
,,	Saturday....	C. E. Truman, M.R.C.S., L.D.S., M.A.

Administrators of Anæsthetics.

9.30 a.m.—	Monday	Dudley W. Buxton, M.D., B.Sc., M.R.C.P.
,,	Tuesday	T. Bird, M.A., M.R.C.S.
,,	Wednesday	J. Mills, M.R.C.S.
,,	Thursday	F. Woodhouse Braine, F.R C.S.
,,	Friday	Frederic Hewitt, M.D.
,,	Saturday	G. H. Bailey, M.R.C.S.

Demonstrators.

W. R. Ackland, L.D.S.
E. Latchmore, L.D.S.

Medical Tutor—W. Patterson, F.R.C.S., L.D.S.

House Surgeon—C. F. Rilot, L.D.S.

Assistant House Surgeon—Wynne Rouw, L.D.S.

Demonstrations.—The Medical Officers will make every effort to give Demonstrations on cases selected from time to time, every morning during the Lecture Season; and at the end of the Course those gentlemen who have attended the Demonstrations to the satisfaction of the Medical Officers will be permitted to perform operations at the Hospital under the supervision of the Medical Officers and the House Surgeon.

Dresserships for Cases of Extraction.—These appointments are held for two months, and consist of six Senior Dresserships for extractions under anæsthetics, and eighteen Junior Dresserships for ordinary extractions.

The Senior Dressers will be selected from those pupils only who have entered fully both to the practice and lectures of this Hospital, and also to the Course required by the College of Surgeons for the Licence in Dental Surgery at one of the general Hospitals.

MEDICAL SCHOOL.

The WINTER SESSION will commence on Oct. 4th, 1886.
The SUMMER SESSION will commence in May, 1887.

LECTURES.

Dental Surgery and Pathology, by F. J. HUTCHINSON, M.R.C.S., L D.S.

Dental Anatomy and Physiology (*Human and Comparative*), by ARTHUR UNDERWOOD, M.R.C.S., L.D.S.

MEDICAL TUTOR.

The Medical Tutor attends on four days in the week, from 5 to 7 p.m., for two months previous to two of the Annual Examinations. His classes are open to all Students, and are intended to assist those who are preparing for their examinations at the College of Surgeons; generally speaking, to guide and direct the studies of the pupils, and prepare them in the subjects for the Examinations.

FEES.

GENERAL FEE FOR THE SPECIAL LECTURES REQUIRED BY THE CURRICULUM.

Viz., two Courses on Dental Anatomy, two Courses on Dental Surgery, two Courses on Mechanical Dentistry, and one Course of Metallurgy, £15 5s.

Fee for the Two Years' Practice of the Hospital required by the Curriculum, £15 15s.

Total Fee for the Special Lectures and Hospital Practice required by the Curriculum, £31 10s.

Students who perform Operations for Filling Teeth must provide their own Instruments for the same.

Additional Fees for a General Hospital for the two years, to fulfil the requirements of the Curriculum, vary from £40 to £50.

PRIZES.

The Prize-day will in future be held in July.

1. Prizes are awarded by the Lecturers for the best examinations in the subjects of their respective courses, at the end of the Summer and Winter Sessions.

2. Arrangements have been made for a prize in Operative Dentistry, in the competition for which each candidate is entrusted with the care of a mouth, which he shall, if not impracticable, set thoroughly in order.

3. A prize of the value of five guineas is also given by Messrs. Ash and Sons for the best essay on a surgical subject connected with the mouth.

4. A scholarship of the value of £20 has been founded by Sir Edwin Saunders, and will be awarded to the Student who has obtained the largest number of First Class Prizes during the Winter and Summer Sessions preceding the July in which the award takes place.

Note.—The Medical Committee have resolved "that the holder of the Saunders' Scholarship be admitted without additional fee to an extra year of hospital practice."

The Dean requests that all Communications relating to the Medical School may be addressed to him at the Hospital, where he will attend in the afternoons, from Sept. 26th to Oct. 1st, inclusive, from 5 till 5.30 o'clock, or on Wednesday mornings from 10.30 till 12.

MORTON SMALE, M.R.C.S., L.D.S., L.S.A., *Dean.*

NATIONAL DENTAL HOSPITAL AND COLLEGE, GREAT PORTLAND STREET, W.

HOSPITAL STAFF.

Consulting Physicians.

B. W. Richardson, M.A., M.D., F.R.S.
W. H. Broadbent, M.D., F.R.C.P.

Consulting Surgeons.

Professor Erichsen, F.R.S. Sir Spencer Wells, Bart., F.R.C.S.
Christopher Heath, F.R.C S.

Consulting Dental Surgeon.

J. Merryweather, M.R.C.S.

Dental Surgeons.

Monday	F. Henry Weiss, L D.S., Eng.
Tuesday	Alfred Smith, L.D.S., Eng.
Wednesday ..	G. A. Williams, L.D.S., Eng.
Thursday	A. F. Canton, L.D.S., Eng.
Friday	Thomas Gaddes, L.D.S., Eng. & Edin.
Saturday	Harry Rose, L.D.S., Eng.

Assistant Dental Surgeons.

Monday	Willoughby Weiss, L.D.S., Eng.
Tuesday	R. G. Bradshaw, L.D.S., Eng.
Wednesday ..	Marcus Davis, L.D.S., Eng.
Thursday	H. G. Read, L.D.S , Eng.
Friday	W. Scott Thompson, M R.C.S., L.D.S., Eng.
Saturday	W. R. Humby, L.D S., Eng.

House Surgeon—I. Prager, L.D.S.I.
Assistant House Surgeon—Mr. C. A. Pattinson.

Anæsthetists.

Henry F. Winslow, M.D , Lond., &c.
C. W. Glassington, M.R.C.S., L.D.S., Edin.
Henry Davis, M.R.C.S., L.S.A.

LECTURERS.

Dental Anatomy and Physiology	Thomas Gaddes, L.D.S., Eng. and Edin.
Dental Surgery and Pathology	Willoughby Weiss, L.D.S., Eng.
Dental Mechanics	Harry Rose, L.D.S., Eng.
Dental Metallurgy	
Operative Dental Surgery ..	W. St. George Elliott M.D., D.D.S.
Dental Materia Medica ..	C. Glassington, M.R.C.S., L.D.S., Edin.
Elements of Histology	Thomas Gaddes, L D.S., Eng. & Edin.
Demonstrator of Dental Mechanics	W. R. Humby, L.D.S., Eng.

The hospital is open for the reception of patients every week-day, from 9 o'clock till 11 o'clock a.m. The House Surgeon attends daily, from 9 a.m. till 2 o'clock p.m.

Dresserships in the Extraction Room.

These appointments are held for three months by six senior and six junior students of the hospital. The respective dressers for each day are required to be in attendance from 9 o'clock till the conclusion of the practice; and they will be under the direction of the Dental Surgeon of the day, and of the House Surgeon.

Clinical Lectures and Demonstrations.

Each medical officer will give clinical lectures, when opportune, during the ensuing year. Clinical lectures will also be given from time to time on cases of special interest; and also demonstrations upon the preparing and filling of cavities, and other operations upon the teeth and contiguous parts.

Attendance and Examination of Students.

A register is kept of the attendance of students at the hospital practice and lectures. An attendance of full two years at hospital practice is required by the College of Surgeons of England; and no schedule will be signed for any lectures of which less than two-thirds have been attended. Class examinations are held frequently during the several courses, to test the progress and attention of the pupils; and at the end of each course of lectures a written examination is held. An insufficient attendance at lectures disqualifies the student for receiving any prize of that year.

Tutorial classes are held by the Dean, to prepare for the final examinations students who have, at this school, complied with the Dental portion of the Curriculum.

LECTURES.

Winter Session, commencing on Friday, Oct. 1st, 1886.

Dental Anatomy and Physiology, by Thomas Gaddes, L.D.S., Eng. and Edin. On Tuesdays and Thursdays, at 7 p.m., during October, November, and December.

Operative Dental Surgery, by W. St. George Elliott, M.D., D.D.S. On Wednesdays, at 7.30 p.m., during November and December. (Free to students of the hospital and college.)

Dental Materia Medica and Therapeutics, by Chas. W. Glassington, M.R.C.S., L.D.S., Edin. On Mondays, at 7 p.m., during October, November, and December. (Free to students of the college.)

Dental Metallurgy. On Tuesdays, at 9 a m., during January, February, and March.

Dental Mechanics, by Harry Rose, L.D.S., Eng. On Mondays, at 7 p.m., during January, February, and March.

Demonstrations on Dental Mechanics, by W. Robinson Humby, L.D.S., Eng. On Wednesdays, at 7 p.m., during January, February, and March. (Free to students of the college.)

Summer Session, 1887.

Dental Surgery and Pathology, by Willoughby Weiss, L.D.S., Eng. On Mondays and Thursdays, at 6 p.m., during May, June, and July.

Elements of Histology, by Thomas Gaddes, L.D.S., Eng. and Edin. On Wednesdays and Fridays, at 7 p.m., during May and June. (Free to students of the college.)

FEES.

General Fee for Special Lectures required by the Curriculum of the Royal College of Surgeons in England. £12 12s.

Fees to Single Courses	One Course.	Two Courses.
Dental Anatomy and Physiology	£2 12 6	£4 4 0
Dental Surgery and Pathology	2 12 6	4 4 0
Dental Mechanics	2 12 6	4 4 0
Dental Metallurgy	3 3 0	5 5 0
*Operative Dental Surgery	2 2 0	
*Dental Materia Medica	2 2 0	
*Elements of Histology	1 1 0	
*Demonstrations on Dental Mechanics	1 1 0	

Hospital Practice to Registered Practitioners (six months), £7 7s. Ditto (twelve months), £9 9s.

Fee for the two years' Hospital Practice required by the Curriculum, £12 12s. Perpetual Fee, £15 15s.

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* These lectures are free to students of the college who have fully entered for the Special Lectures.

Total Fee for the Special Lectures and Hospital Practice required by the Curriculum, £25 4s. Perpetual Fee, £31 10s.

PRIZES.

Five Prizes, in Medals, are open for competition among the Students of the College, at the end of each Course of Lectures, on the following subjects, viz. : Dental Anatomy, Dental Surgery, Dental Mechanics, Metallurgy, and Operative Dental Surgery. A prize will also be given for Dental Materia Medica.

Certificates of Honour will be awarded to those Students who show superior proficiency in any of the classes.

The Rymer Gold Medal for General Proficiency, value £5, will be awarded annually to the most distinguished Student of the year. His general conduct and attendance must have been in every respect satisfactory. At the time of the special examination for the Rymer Medal the Student must not hold any qualification. The Medal will be awarded on the understanding that the Student completes the Dental Curriculum.

The Public Distribution of Prizes will take place at the commencement of the Summer Session. THOMAS GADDES, *Dean.*

EDINBURGH.

DENTAL HOSPITAL AND SCHOOLS.

Consulting Physician—ALEX. PEDDIE, M.D., F.R.C.P.E.
Consulting Surgeon—JOSEPH BELL, F.R.C.S.E.
Consulting Surgeon Dentist—Dr. JOHN SMITH, F.R.C.S.E.

Dental Surgeons.

CHARLES MATTHEW, L.D.S., Edin.
WILLIAM BOWMAN MACLEOD, L.D.S. Edin.
MATTHEW FINLAYSON, L.D.S. Edin.
ANDREW WILSON, L.D.S. Edin.
GEORGE W. WATSON, L.D.S Edin.
MALCOLM MACGREGOR, L.D.S. Edin.
EDWIN A. CORMACK, L.D.S., L.R.C.P., & S. Edin.

Assistant Dental Surgeons.

J. S. AMOORE, L.D.S., Eng.
J. STEWART DURWARD, L.D.S., E.
J. GRAHAM MUNRO, L.D.S., Edin.
JAMES MACKINTOSH.
J. LINDSAY, L.D.S., Edin.
W. FORRESTER.

Honorary Treasurer and Dean.
WM. BOWMAN MACLEOD, L.D.S., 43, George Square.

DENTAL SCHOOL.

LECTURES.

Dental Anatomy and Physiology (Human and Comparative) by ANDREW WILSON, L.D.S. (Edin).—These Lectures will be delivered on the evenings of Tuesday and Friday, at 8 o'clock, commencing on 2nd November, 1886. The course, consisting of twenty-four Lectures, will be illustrated by preparations, models, diagrams, microscopical specimens, etc.

Dental Surgery and Pathology, by GEORGE W. WATSON, L.D.S. (Edin). —These Lectures will be delivered on the mornings of Tuesday and Friday, at 8 o'clock, during the Summer Session, commencing 3rd May, 1887. The Course, consisting of twenty Lectures, will be illustrated by preparations, models, diagrams, microscopical preparations, etc.

Mechanical Dentistry, by W. BOWMAN MACLEOD, L.D.S. (Edin).—The Lectures will commence on 3rd November, 1886, at 8 p.m., and be continued every Wednesday thereafter till the Course of at least twelve Lectures is concluded.

Practical Mechanics—Assistant Demonstrator, J. **Stewart Durward**, L.D.S. (Edin).—In addition to the Systematic Lectures, there will be given, during the Session, Demonstrations on Dental Mechanics, and each Student will be expected to prepare the mouth, take the impression, make the denture, and insert the same in at least four cases. The Demonstrations will be spread over the two years of Hospital practice, and will be given as occasion serves. Students will require to furnish their own hand tools.

In the various classes prizes will be offered for competition.

General Fee for the Hospital Practice and Special Lectures required by the Curriculum.—Hospital Practice, £15 15s. One Course each of Dental Anatomy, Dental Surgery, and Mechanical Dentistry and Demonstrations, £9 15s—£25 10s.

Fees to separate Classes.—Dental Anatomy, Dental Surgery, Mechanical Dentistry, £3 5s. each.

The Hospital Practice and Lectures qualify for the Dental Diploma of the Royal College of Surgeons, Edinburgh, and also for that of the other Licensing Bodies. Second Courses of the Lectures, as required by the Royal College of Surgeons of England, £2 4s.

For further information apply to the Dean, who will be found at the Hospital every Wednesday morning between 9 and 10 o'clock.

The Session 1886—7 opens November 1st, 1886.

General Fee for the Hospital Practice and Special Lectures required by the Curriculum.

Hospital Practice, Two Years					£15	15	0
One Course of not less than	24	Lectures in Dental	Anatomy	...	9	15	0
,, ,,	20	,, ,,	Surgery	...			
,, ,,	12	,, ,,	Mechanics	...			
Total					£25	10	0

For further particulars, apply to the Dean, 30, Chambers Street, Edinburgh.

GLASGOW.

DENTAL HOSPITAL AND SCHOOL, ANDERSON'S COLLEGE.

Hon. Consulting Physician.—W. T. **Gairdner**, M.D.
Hon. Consulting Surgeon.—C. H. B. **Macleod**, M.D.
Chloroformist.—**William Muir**, M.B., C.M.

Dental Surgeons.

J. A. **Biggs**.
W. S. **Woodburn**, L.D.S., F.P.S.G.
Rees Price, L.D.S., Eng.
James Cumming, L.D.D. Glas.
J. R. **Brownlie**, L.D.S., M.R.C.S. Eng.
J. C. **Woodburn**, M.D.

Assistant Dental Surgeons.

A. B. **Young**, L.D.S., Glas.
W. M. **Adamson**, L.D.S. Glas.
W. F. **Martin**, L.D.S.
D. R. **Cameron**, L.D.S.
J. M. **McCash**, L.D.S. Glas.
B. **Sutherland**.
Oswald Fergus, L.D.S., Glas.

Dental House Surgeon.—

The Hospital is open daily, except Sunday, at 5 p.m. till 7 p.m. Anæsthetics administered, when required, at 9 a.m.

The work of the Hospital is conducted, as far as possible, by the Students, under the supervision of the Dental Officer of the day. Cases of special interest will be made the subject of clinical instruction or demonstration as they occur.

The practice of the Hospital may be entered upon at any time during the Session, and attendance dated therefrom. Fee for the two years' practice required by the curriculum, £10 10s. Fee for each course of Lectures, £2 2s.

The Dental Students' Society meets once a month in the Committee Room of the Hospital, when papers on subjects of interest are read and discussed by the Members.

DENTAL SCHOOL.

Secretary to the Dental Lectures—DAVID TAYLOR, M.D.,L.D.S., Glas. Dental Anatomy and Physiology, Human and Comparative, by DAVID TAYLOR, M.D., L.D.S., Glas.

The Lectures will be delivered in the Summer Session, on the Mornings of Wednesday and Friday, at 8 a.m., and will be illustrated by Diagrams, Preparations, and Microscopic Specimens. Text-Book—Tome's Manual of Dental Anatomy, Human and Comparative.

Dental Surgery and Pathology, by JAMES RANKIN BROWNLIE, L.D.S., Eng., M.R.C.S.

These Lectures are delivered on Tuesdays and Thursdays, during the months of May and June, at 8 a.m., and will be illustrated by recent Specimens, and other Preparations, and Drawings. &c. Text-books—Tomes's Manual of Dental Surgery; Salter's Dental Pathology and Surgery; Harris's Principles and Practice of Dentistry.

Mechanical Dentistry, by W. S. WOODBURN, L.D.S., Glas.

This Course will commence on the first Thursday of October, at 8 o'clock p.m., and will consist of 12 Lectures, with Practical Demonstrations in Dental Laboratory.

All communications on matters relating to the Dental School should be addressed to J. R. BROWNLIE, 220, West George Street, Glasgow, who will forward detailed Prospectus of the School.

BIRMINGHAM.

BIRMINGHAM SCHOOL OF DENTISTRY, QUEEN'S COLLEGE.

The teaching of Dentistry is now undertaken by the Queen's College, acting in association with the Birmingham Dental Hospital, and the Birmingham Clinical Board, so that students may fully qualify themselves for the Dental Diplomas of the Royal Colleges.

The Dental Hospital is situated near the College, and is open daily (Sundays excepted). The number of patients treated there during the past year was upwards of 9,000.

The General and Queen's Hospitals offer every advantage for the study of General Surgery and Medicine, the arrangements for which are carried out under the direction of the Birmingham Clinical Board.

LECTURES FOR THE DENTAL CURRICULUM.

WINTER SESSION.

Special Subjects.

Dental Anatomy and Physiology.—J. HUMPHREYS, L.D.S.I., Dental Surgeon to the Dental Hospital. Thursdays at 5 p.m.

Dental Surgery and Pathology.—C. SIMS, L.D.S., Eng., Senior Dental Surgeon to the Dental and Queen's Hospitals. Fridays, at 5 p.m.

Dental Metallurgy.—W. A. TILDEN, D.SC., F.R.S. N.B.—This Class will be held at Mason's College. About ten lectures on this subject will be given on Tuesdays at 2.30 p.m., from October to Christmas.

General Subjects.

Anatomy, Practical Anatomy, Physiology, Chemistry, Medicine, Surgery. These Classes are similar to those in the Medical Department.

SUMMER SESSION

Special Subjects.

Dental Mechanics.—W. ELLIOTT, L.D.S., Edin., & Dub., F.C.S. Wednesdays, at 5 p.m.

General Subjects.

Materia Medica and Therapeutics.—Practical Chemistry.—These Classes are similar to those in the Medical Department.

FEES.

A Composition Fee of 60 guineas, payable in one sum, or in two sums, viz., 40 guineas at the beginning of the first year, and 20 guineas at the beginning of the second year of studentship, admits to the full curriculum required for the Dental Diploma (inclusive of the necessary Hospital Practice).

N.B.—Further particulars may be obtained on application to the Warden at the College, or to the Hon. Secretary of Surgical Committee, Dental Hospital.

BIRMINGHAM DENTAL HOSPITAL.

71, NEWHALL STREET.

OPEN DAILY AT NINE A.M.

Consulting Physician—JAMES SAWYER, M.D., London, F.R.C.P., Senior Physician to the Queen's Hospital.

Consulting Surgeon—FURNEAUX JORDAN, F.R.C.S., Senior Surgeon to the Queen's Hospital.

Consulting Dentists.

THOMAS R. ENGLISH.
ADAMS PARKER, L.D.S. Eng.

Adminstrators of Anæsthetics.

J. GRINLING, M.B.
C. E. GOSLING, M.D.
T. HOLDSWORTH, M.R.C.S.
J. C. HUXLEY, M.D.
WRIGHT WILSON, F.R.C.S. Ed.
E. D. VINRACE, M.R.C.S.
J. F. VINCE, M.B.

Dental Surgeons.

CHARLES SIMS, L.D.S., Eng.
H. BREWARD NEALE, L.D.S.I.
F. E. HUXLEY, M.R.C.S., L.D.S.
J. HUMPHREYS, L.D.S.I.
F. W. RICHARDS, L.D.S., Eng.

Assistant Dental Surgeons.

F. H. GOFFE, L.D.S.
W. R. ROBERTS, L.D.S.

House Surgeon—W. PALETHORPE, L.D.S.

DAYS OF ATTENDANCE.

Mondays	Mr. J. HUMPHREYS.
Tuesdays	Mr. F. W. RICHARDS.
Wednesdays	Mr. CHARLES SIMS.
Thursdays	Mr. H. BREWARD NEALE.
Fridays	Mr. F. W. RICHARD.
Saturdays	Mr. F. E. HUXLEY.

DEMONSTRATIONS.

Clinical Demonstrations will be given from time to time by the staff on cases of particular interest; also upon the preparing and filling of cavities, and other operations upon the teeth and contiguous structures.

Dresserships, &c. (as previously).

Dental Students are required to register their names for Hospital Practice with the Honorary Surgical Secretary, Mr. F. W. Richards, 33, Paradise Street, from whom further information may be obtained.

DENTAL HOSPITAL OF IRELAND.

29, YORK STREET, DUBLIN.

The Winter Session will commence Monday, October 5th, 1886.
The Summer Session will commence in May, 1887.

Consulting Physicians.

Robert D. Lyons, M.D., M.P. | John W. Moore, M.D.

Consulting Surgeons.

D. H. Bennett, F.R.C.S.I. | William Stokes, F.R.C.S.I

Consulting Dental Surgeons.

R. H. Moore, F.R.C.S.I. | Daniel Corbett, M.R.C.S.E.

Dental Surgeons.

John A. Baker, F.R.C.S.T.
R. Theodore Stack, F.R.C.S.I., D.M.D. (Harv.)
A. W. W. Baker, M.B., Ch.M., L.D.S.
Daniel Corbett, Jun., F.R.C.S.I.

Demonstrator—G. W. Yeates, M.B., Ch.M., L.D.S.

Pathologist—Phin. S. Abraham, F.R.C.S.I.

Registrar—William A. Shea.

In connection with the Dental Hospital of Ireland, the Dental School will be open for the Winter Session on October 5th, 1885.

All Dental Students who have passed their Preliminary Examination are admissible to the Clinical Instruction of the Hospital, after paying Fees and subscribing to the conditions prescribed by the Staff.

In addition to Clinical Instruction, Courses of Lectures will be given through the year on Dental Surgery, Dental Anatomy, Mechanical Dentistry, and Metallurgy, by the following Lecturers:—Dental Surgery: A. W. W. Baker, M.B., Ch.M. Dental Anatomy: Daniel Corbett, Jun., A.B., F.R.C.S.I. Mechanical Dentistry: R. Theodore Stack, M.D., F.R.C.S.I., D.M.D., Professor of Dentistry, Royal College of Surgeons. Metallurgy: Charles Cameron, M.D., F.R.C.S.I., Professor of Chemistry, Royal College of Surgeons.

These lectures are intended to supplement the lectures given in the Medical Schools, and give to the Dental Student in Ireland the opportunity of fulfilling in his own country the conditions of curriculum required by the different licensing bodies in the United Kingdom.

The lectures on Mechanical Dentistry and Metallurgy will be given during the winter; those on Dental Surgery and Anatomy during the summer months. In addition to the longer courses, special courses, of three months' duration, will be given to Surgeons about to join the Army and Navy, or to practise in the Colonies.

Amongst the advantages of the School is the Mechanical Laboratory, where each Student is allotted his own bench, and every effort is made to assist him in Mechanical Dentistry. This year, in addition to practical instruction in the details of Gold, Dental Alloy, Vulcanite, Celluloid, and continuous Gum Work, special demonstrations will be given in the Mechanical treatment of Cleft Palate, by Mr. Theodore Stack; in the Treatment of Dental Irregularities, by Mr. A. W. W. Baker; and in the various methods of inserting Pivot Teeth, by Mr. Daniel Corbett, jun.

Regulations as to Fees and other conditions are the same as exist at the Dental Hospital of London, Leicester Square. Any further information can be obtained from Mr. William Sheda, Registrar of the Hospital, or

R. Theodore Stace, Dean.

MANCHESTER.

THE VICTORIA DENTAL HOSPITAL OF MANCHESTER.

98, GROSVENOR STREET, ALL SAINTS'.

The Hospital is open every morning (Sundays excepted), and on Monday, Wednesday, and Friday evenings. Patients admitted from 8 to 9.30 in the morning, and from 6.30 to 7.30 in the evening.

Hon. Treasurer.
F. W. Travers.

Hon. Secretary.
Henry L. Knoop.

Consulting Physicians.

Sir Wm. Roberts, F.R.C.P.
Dr. Simpson, M.R.C.S.
Dr. Morgan, F.R.C.P.
Dr. Leech, F.R.C.P.
Dr. D. Lloyd Roberts, F.R.C.P.

Consulting Surgeons.

E. Lund, F.R.C.S.
E. A. Heath, M.R.C.S.
W. Whitehead, F.R.C.S.
T. Jones, F.R.C.S.
J. Hardie, F.R.C.S.

Consulting Dental Surgeons.

H. Champion, M.R.C.S.
S. A. Rogers, L.D.S., Eng.
Parsons Shaw, D.D.S.
G. W. Smith, M.R.C.S. & L.D.S. Eng.

Dental Surgeons.

G. G. Campion, L.D.S., Eng.
E. P. Collet, L.D.S., Eng.
W. Dougan, L.D.S.I.
L. Dreschfeld, L.D.S.I.
J. W. Dunkerley.
W. Dykes, L.D.S., Glasgow.
W. Headridge, L.D.S.I.
H. A. Mann.
J. H. Molloy, L.D.S.I.
H. Planck, L.D.S I.
J. Renshaw, L.D.S.I.
W. Simms, L.D.S.I.
W. Smithard, L.D S.I.
G. Tanner, L.DS , Eng.
T. N. Skipp, L.D.S., Eng.
H. Wood, L.D.S.I.

Administrator of Anæsthetics.

J. J. Kent Fairclough, M.D., M.R.C.P.

Warden.

Parsons Shaw, D.D.S.

Winter Session, 1886—7.

Anatomy and Dissections
Physiology
Medicine
Surgery
Chemistry
Dental Mechanics

Summer Session, 1887.

Materia Medica
Practical Chemistry
Dental Anatomy and Physiology
,, Surgery
Metallurgy.

The Summer session commences on the 1st May, the Winter session on 1st October.

This hospital was recognised by the Royal College of Surgeons of England in November, 1884.

The Fee for the two years' Hospital Practice is £12 12s.

For further information apply to the Hon. Secretary.

LIVERPOOL.

DENTAL HOSPITAL, MOUNT PLEASANT.

NORTHERN BRANCH—15, GREAT MERSEY STREET.

Consulting Physician—THOMAS ROBINSON GLYNN, M.D., M.R.C.P., Lond.

Consulting Surgeon—FRANK T. PAUL, F.R.C.S.

Consulting Dental Surgeons.

W. J. NEWMAN, L.D.S.I. | W. H. WAITE, D.D.S., L.D.S.I.

Dental Surgeons.

THOMAS F. AUSTIN.
R. EDWARDS, M.R.C.S., Eng. L.D.S. Eng.
J. N. P. NEWTON, L.D.S., Eng. D.D.S.
FREDERICK ROSE, L.D.S. Eng.
E. A. COUNCELL, L.D.S.

Assistant Dental Surgeons.

CHAS. T. STEWART, L.D.S.I.

Honorary Assistant Dental Surgeon.

M. ALEXANDER, L.D.S.I. | E. A. DAVIS, R.C.S.I.

Hon. Demonstrator of Operative Dental Surgery.

THOMAS MANSELL, R.C.S. Edin.

Assistant Dental Surgeon of Northern Branch—C. B. DOBSON, L.D.S.I.

This Hospital is a School of Practical Dental Surgery, duly recognised by the Royal College of Surgeons, and open to all Students of Dentistry, under such regulations as shall be determined by the Committee of Management.

The Hospital is open daily for the admission of patients from 8.30 till 10 a.m., and from 5.30 to 8 p.m. Northern Branch open 9 to 10 a.m., and 6 to 7 p.m.

Fees for Hospital practice, £5 5s. per annum, or a composition fee of £8 8s. for two years Hospital Practice, required for the curriculum to Students of the Medical Faculty, University College, Liverpool, and pupils or apprentices of registered Dentists.

Further information may be obtained by applying to the Honorary Secretary, W. L. JACKSON, C, Queen Insurance Buildings, 10, Dale Street.

PLYMOUTH.

DENTAL DISPENSARY, OCTAGON.

Physician—C. ALBERT HINGSTON, M.D., Lond.

Surgeons.

CHRISTOPHER BULTEEL, F.R.C.S. | CONNELL WHIPPEL, M. R.C.S.

Consulting Dentist—F. A. JEWERS, M.D.S.

Dental Surgeons.

W. V. MOORE, L.D.S., Eng.
C. S. BATE, F.R.S., L.D.S., Eng.
F. H. BALKWILL, L.D.S., Eng.
ERNEST E. JEWERS, L.D.S., Eng.
ERNEST EDWARD JEWERS, L.D.S.E.
HENRY WILLIAM MAYNE, L.D.S.I.

Treasurer—ALFRED PAYNE BALKWILL.

The Dentists attend each day, at 9 a.m., except Sundays.

DENTAL SCHOOL.

Certificates of attendance on the practice of this Dental Dispensary are recognised by the College of Surgeons as qualifying for the Diploma in

Dental Surgery. The College also recognises the lectures delivered at the Dispensary.

Pupils of any of the Dental Surgeons of the Plymouth Dental Dispensary, or other Dentists holding a Diploma of the College of Surgeons, or Member of the Odontological Society, may attend the Dispensary on the day of such practitioner as may agree to accept such pupil, or pupils, on the payment of £1 1s. per annum to the Institution.

LECTURES.

On "Dental Physiology," by C. SPENCE BATE, F.R.S., L.D.S., R.C.S.E.
On "Dental Anatomy," by F. H. BALKWILL, L.D.S., R.C.S.E.
Fee to Lectures, one Course, £7 7s.
Fee to Lectures, double Course, £12 12s. (required for Diploma).
Fee to Dental Practice at Dispensary, £5 5s. per annum.
Fee to entire Dental Curriculum (required for Diploma), 22 Guineas.

Further information may be obtained from the Secretary, Mr. E. G. BENNETT, at above address.

EXETER.

DENTAL HOSPITAL.

Consulting Surgeons.

A. J. CUMMING, F.R.C.S., Eng. | WM. CLAPP, F.R.C.S., Eng.

Dental Surgeons.

J. T. BROWNE-MASON, L.D.S., Eng. | T. G. T. GARLAND, L.D.S.I.
S. BEVAN FOX, L.D.S., Eng. | J. M. ACKLAND, M.R.C.S., L.D.S., Eng.
HENRY BIGING MASON, L.D.S., Eng.
S. MUNDELL, L.D.S., Eng.

Surgeon Administrators of Anæsthetics.

JOHN MORTIMER, M.B., Lond. | ARTHUR C. ROPER, M.R.C.S., Eng.

Hon. Secretary.

HENRY J. HOLDEN.

Attendance on the practice of this hospital is recognised by the Royal College of Surgeons of England as qualifying for their Dental diploma.

The hospital is open daily (Sundays excepted), and patients are admitted between the hours of 9 and 11 a.m.

Pupils of any member of the staff, or other registered practitioner (being a Life or Annual Governor), are permitted to attend the practice of the hospital, subject to the approval of the Medical Sub-Committee, on payment of Five Guineas annually to the Funds of the Institution. Students attending the practice of the hospital must consider themselves strictly under the control of the Medical Officers, and must not undertake any operation without the consent of the Dental Surgeon for the day.

Number of cases treated in 1886, 4,827.

PRIVATE SCHOOL OF ANATOMY, PHYSIOLOGY, SURGERY;

And also professional subjects, including Chemistry, Physics, Materia Medica, Botany and Pharmacy; Medicine Obstetrics, Diseases of Women and Children; Comparative Anatomy, Embryology, etc.

Demonstrations and lectures by Mr. Thomas Cooke, F. R.C.S., senior Assistant Surgeon to the Westminster Hospital, and other Masters.

This school of anatomy, physiology, surgery, etc., meets the requirements of three classes of students, *i.e.* :

I. Qualified Practitioners and advanced Students, *i.e.*, gentlemen wishing either to obtain some of the Higher Qualifications, or to compete for Appointments in Her Majesty's Army, Navy, and Indian Medical Services.

II. Students preparing for the usual Primary and Pass Examinations of any of the Licensing Bodies.

III. Beginners entering upon their Medical Studies, either by a short term of apprenticeship, or under the new regulations of the Examining Board in England.

Both rapid advanced classes, complete in three months or less, but still thoroughly practical, are provided ; and also, as required, more elementary classes of six months' duration.

The Instruction is given on the dissected and undissected body, with normal and pathological specimens, microscopical preparations, chemical, physiological, and surgical apparatus, splints, etc. The operations of surgery are performed on the dead body. Arrangements can be made for the attendance on midwifery cases, and for practical work in the dispensary.

The operations of surgery are all performed on the dead body by the students. The course is recognised by the London University.

The dissecting-room is open daily from 10 a.m. to 6 p.m. The demonstrators attend four hours daily. The Physiological and Chemical Laboratories are fitted with the requisites for practical work, and every effort is made to render the teaching thoroughly practical and demonstrative.

Fees.—Anatomy and physiology. For primary membership examination of Royal College of Surgeons, three months, £4 4s. ; six months, £5 5s. For primary fellowship examination, six months, £5 5s. Surgery : For second membership examination of Royal College of Surgeons, three months, £5 5s. ; six months, £8 8s. ; for second fellowship examination, six months, £8 8s.

IV.—GENERAL HOSPITALS.

CHARING CROSS HOSPITAL.

Dental Surgeon—J. FAIRBANK, M.R.C.S., who attends at the Hospital, three days a week, at 9 a.m., for Dental operations. A course of Lectures on Dental Surgery is also given during January, February, and March.

The fee at this hospital for the L.D.S. Course is £42 2s., which may be paid in two instalments ; this includes the Library fee of £2 2s., for which the student enjoys all the privileges of general students, which are as follows :

1st. They pay a proportionately lower amount of fees.

2nd. They alone are eligible for the following offices and appointments: —Resident medical officers, resident surgical officers, resident accoucheur, assistant demonstrators, pathological assistant, clinical clerks, dressers, dentist's assistants, etc.

3rd. They are admitted to the use of the library, and reading room, and museum.

4th. They are admitted, without additional fee, to the clinical and pathological demonstrations, and enjoy other advantages.

5th. They alone are entitled to compete for the scholarships.

Two prizes are awarded annually in the class of Lectures on Dental Surgery, of the value of six guineas and four guineas respectively.

Students may serve as assistants to the Dental Surgeon for a period of three months.

The attention of Dental students is drawn to the re-arrangements which have been made in the hours of lectures, so as to enable students to attend the practice at the Dental Hospital of London. Charing Cross Hospital is within three minutes' walk of the Dental Hospital of London.

For further information apply to the Dean, Dr. J. Mitchell Bruce, or to the Secretary, who attends daily at the office of the Medical School, Chandos Street, Charing Cross, between the hours of 10 and 4.

LONDON HOSPITAL MEDICAL COLLEGE.

Dental Surgeon—ASHLEY BARRETT, M.B., Lond., M.R.C.S., L.D.S.

The Council of the College of Surgeons recognise the Dental Department of the London Hospital as a school at which may be obtained the Dental Practice necessary to qualify a student for the Examination of the Dental Diploma. Dental Students may obtain the General Medical Education (that is, apart from certain Special Lectures to be attended at a Dental School) and the Dental Practice, necessary for the Diploma, at the London Hospital School, on payment of Forty Guineas.

A course of Lectures on the Anatomy and Pathology of the Teeth, and Dental Surgery, will be delivered by Mr. Ashley Barrett, on days which will be duly announced. It comprises the treatment of Dental Irregularities, and of Toothache, and such matters in connection with the subject as are of interest to the Medical Practitioner. Mr. Barrett gives practical instruction on Tuesdays, at 9 a m., which is open to all students of the School and Hospital, and can be attended by gentlemen who are not pupils, on payment of a fee of Ten Guineas.

A Dental Assistant is elected every three months, without any additional expense. The terms of office date from the first Tuesday in January, April, July, and October. In selecting Candidates, priority will be given to those who have attended the greatest number of Lectures on Dental Pathology and Surgery, and have also been the most punctual in attendance in the Dental Department on Tuesday mornings.

Further information may be obtained on application to Mr. Munro Scott, the Warden, Medical College, London Hospital.

KING'S COLLEGE, STRAND, W.C.

Special arrangements are made for Dental Students. Apply to the Dean.

MIDDLESEX HOSPITAL.

Consulting Dental Surgeons.—SIR J. TOMES, F.R.S., F.R.C.S., L.D.S., and J. S. TURNER, M.R.C.S , L.D.S.

Dental Surgeon—W. STORER BENNETT, F.R.C.S., L.R.C.P., L.D.S.

Assistant Dental Surgeon—W. HERN, M.R.C.S., L.D.S.

Students who intend to become Licentiates in Dental Surgery of the Royal College of Surgeons are admitted to attend the requisite courses of Lectures—which are arranged to fit in with the work at the Dental Hospitals —and Hospital Practice on payment of a fee of 40 guineas, in one payment, or by instalments of £30 on entrance, and £15 at the beginning of the second Winter Session.

A short course of Lectures on Dental Surgery will be delivered during November and December by the Lecturer on Dental Surgery, Mr. Storer Bennett. The Lectures will be supplemented by practical Demonstrations, which will be given every week during the Winter and Summer Sessions by the Dental Surgeon and Assistant Dental Surgeon. Students of the Hospital free; others pay a fee of 2 guineas.

Further information may be obtained from A. Pearce Gould, Esq., the Dean, or from the Resident Medical Officer at the hospital.

GUY'S HOSPITAL MEDICAL AND SURGICAL SCHOOL.

Dental Surgeon—H. MOON, M.R.C.S., L.D.S.

Assistant Dental Surgeon –F. NEWLAND PEDLEY, F.R.C.S., L.D.S.

Dressers are appointed to the Dental Surgeon, and hold office for two months, each receiving special certificates.

Practical instruction in Dental Surgery is given every Tuesday at 1.30, and Thursday at 12.30 o'clock. A certain number of cases of cleft palate, perforate palate, irregularities, lost portions of jaw, &c., are constantly under treatment for the instruction of students, the necessary apparatus being supplied at the expense of the hospital.

A course of Lectures on Dental Surgery is delivered during the Summer Session, and special instruction is given on this subject in the Surgery, by Mr. Moon, throughout the year.

Application respecting the School may be made to the Dean, Dr. F. Taylor.

ST. GEORGE'S HOSPITAL.

Dental Surgeon—A. Winterbottom, F.R.C.S., L.D.S.

Mr. Winterbottom attends at the hospital on Tuesdays and Saturdays at 9 a.m.; his assistant daily at 9 a.m. and at 1 p.m.

A course of Lectures on Dental Surgery is given by Mr. Winterbottom in the Summer Session. Free to students of the hospital.

Fee for general subjects in Dental Surgery, including Practical Chemistry, £55. Payable in two instalments; first year £30; second year £25.

Further information can be obtained by application to Dr. Wadham, Dean of the Medical School.

ST. BARTHOLOMEW'S HOSPITAL AND COLLEGE.

Dental Surgeons—Mr. Ewbank, Mr. Patterson.

Assistant Dental Surgeons—Mr. Ackery, Mr. Mackrell.

The Dental Department of the hospital is open on Tuesday and Friday mornings at 9 o'clock. The practice of the department is recognised by the Royal College of Surgeons.

The fee for general subjects for Dental students for the first winter is £33 2s. 6d., for the first summer £33 2s. 6d., or a single payment of £66 3s.

This hospital is the oldest and one of the largest in London, and among many advantages which it offers to the student is that provision is made for their residence in the College, on the recommendation of a medical officer of the hospital. For the terms of board and residence, and all other information regarding the College applications should be made, either personally, or by letter, to the Warden of the College, Dr. Moore.

ST. MARY'S HOSPITAL MEDICAL SCHOOL.

Dental Surgeon—H. Howard Hayward, M.R.C.S., L.D.S.

Practical instruction in Dental operations is given on Wednesdays and Saturdays, at 9.30 a.m. Dressers are appointed, who hold office for three months. Also a special course of Lectures on Dental Surgery.

Fee for the course, £2 12s. 6d.

For prospectus and further information apply to the Dean, who may be consulted in his room daily at 3.30 p.m.; or to the Medical Superintendent at the Hospital.

GEORGE P. FIELD, Dean of the School.
SIDNEY PHILLIPS, M.D., Sub-Dean.

ST. THOMAS'S HOSPITAL.

Dental Surgeon—Charles Edwin Truman, M.R.C.S., L.D.S.

Assistant Dental Surgeon—

Gentlemen may receive instruction in diseases of teeth, are appointed dressers, and can undertake operations, subject to the supervision of the Dental Surgeons, Tuesdays and Fridays at 10 a.m.

Numerous cases of irregularity of the teeth, stoppings, and the application of artificial appliances, are undertaken during the term.

The fee for attendance on the *general* subjects required of the students in Dental Surgery, is, for the two years, £55, or, by instalments, £50 for the first year, and £10 for the second year.

Dental practice, one year, two guineas; perpetual, three guineas.

For further information apply to G. RENDLE, ESQ., M.R.C.S., Medical Secretary.

WESTMINSTER HOSPITAL.

Dental Surgeons—J. WALKER, M.D., M.R.C.S., L.D.S., and A. MORTON SMALE, M.R.C.S., L.D.S.

Dr. Walker attends at 9.15 a.m. on Wednesdays, and Mr. Morton Smale on Saturdays at 9.15 a.m., for practical demonstration of diseases and operations on the teeth.

The fee for attendance on the Dental Practice is £2 2s. for three months, and £3 3s. for six months. The whole of the General Lectures and Surgical Practice required for the Dental Diploma of the College of Surgeons can be attended for £50, in one sum, on entrance, or for two sums of £32 10s. and £20, payable at the beginning of each year.

Dr. Walker will deliver a course of Lectures on Dental Surgery and Pathology on Wednesdays, in October, November, and December, at 9.30 a.m.

Classes in Metallurgy in its application to Dental purposes, Dental Anatomy and Physiology, and in Dental Mechanics, will be formed should a sufficient number of Students give in their names.

The Calendar will be forwarded on application to Dr. de Havilland Hall, Dean of the School, who will afford every information.

SCHOOL OF MEDICINE, SURGEON'S HALL, EDINBURGH.

The fees required for students attending general subjects necessary for the curriculum of the Royal College of Surgeons, Edinburgh, are £38 10s.

HARVARD UNIVERSITY, DENTAL DEPARTMENT, BOSTON, MASS., U.S.A.

The Sessions of this School begin the last Thursday in September, and end the last in June, making nine months of practically continuous work in each year.

General Anatomy, with Dissections, Physiology, and General Chemistry, are the Studies of the first year. Of the second year they are Operative and Mechanical Dentistry, Dental Materia Medica and Therapeutics, Oral Surgery, and Surgical Pathology. The Student can also attend gratuitously all the *lectures* in any other department of the University.

The infirmary of the Massachusetts Hospital furnishes abundant facilities, averaging 8,000 operations, of which a large proportion consist of filling teeth, every year.

The University degree, D.M.D. (Dentariæ Medicinæ Doctor) is conferred on all who fulfil the requirements.

The diploma is recognised by the English Medical Council.

For the first year a student is a member of the school, the fee is 200 dols.; for the second year, 150 dols.; and for any subsequent year, 50 dols.

For further information and catalogues, address: Thomas H. Chandler, Dean, Hotel Bristol, corner of Boylston and Clarendon Streets, Boston, Mass., U.S.A.

THE DENTAL COLLEGE OF THE UNIVERSITY OF MICHIGAN.

The Ninth Annual Session of this Institution will commence on the 1st of October, and close on the last Wednesday of March, thus making a course of nine months. A preliminary examination, having reference to general educational attainments, is required.

The Student in this department will receive instructions in Anatomy, Physiology, Pathology, Chemistry, Materia Medica, Therapeutics and Surgery, from the Professors of their respective branches in the *Department of Medicine and Surgery* of the University, when lectures commence and continue the same as with the Dental College.

FACULTY OF THE DENTAL DEPARTMENT.

President.
J. B. Angell, L.L.D.
Principles and Practice of Operative Dentistry.
J. Taft, M.D., D.D.S.
Anatomy and Physiology.
Corydon L. Ford, M.D., D.D.S.
Lecturer on Oral Pathology and Surgery.
J. N. Martin, Ph M., M.D.
Clinical and Mechanical Dentistry.
J. A. Watling, D.D.S.
Prosthetic Dentistry.
W. H. Dorrance, D.D S.
Demonstrator of Clinical Dentistry.
Miss E. A. Nallock, D.D.S.
Demonstrator of Prosthetic Dentistry.

Special instruction will be given in Dental Pathology, Oral Surgery, Dental Therapeutics, and Diseases of Women and Children, with reference to the teeth.

Students should be promptly present at the College on Thursday, September 30th, at 2 o'clock p.m., to make the preliminary arrangements for entering upon regular work.

CONDITIONS OF GRADUATION.

The candidate must be twenty-one years of age. He must furnish evidence of good moral character.

He must devote three years to the study of his profession. He must attend two full courses of lectures in the Dental College, or one course in some College having an equal standard of requirements and the last one here, and we recommend that he attend three courses regularly.

He must sustain an examination satisfactory to the Faculty in all the branches taught.

FEES AND EXPENSES.

The fees, which must be paid in advance, are as follows:—

Residents of Michigan.—Matriculation. Dols. 10.00; annual dues, Dols. 25.00.

Non-Residents.—Matriculation, Dols. 25.00; annual dues, Dols. 35.00.

Graduation Fee.—For all alike, Dols. 10.00. The admission fee is paid but once, and entitles the student to the privilege of permanent membership in any department of the University. The annual due is paid the first year and every year thereafter while at the University.

For further particulars, address the Dean of the Dental College, Ann. Arbor, Mich.—J. Taft, Dean.

IV.—SCIENTIFIC ASSOCIATIONS.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN,

40, LEICESTER SQUARE.

OFFICERS FOR 1886.

President—T. CHARTERS WHITE.

Vice-Presidents.

RESIDENT.	NON-RESIDENT.
GEORGE GREGSON.	RICHARD WHITE (Norwich).
HENRY SEWILL.	ANDREW WILSON (Edinburgh).
S. J. HUTCHINSON.	RICHARD ROGERS (Cheltenham).

Treasurer—JAMES PARKINSON.

Librarian—FELIX WEISS. | *Curator*—STORER BENNETT.

Editor of the Transactions—FREDERICK CANTON.

Honorary Secretaries.

DAVID HEPBURN (Council). | ROBERT H. WOODHOUSE (Society).

WILLOUGHBY WEISS (For Foreign Correspondence).

Councillors.

RESIDENT.	NON-RESIDENT.
WM. ST. GEORGE ELLIOTT.	W. E. HARDING (Shrewsbury).
AUGUSTUS WINTERBOTTOM.	ROBERT REID (Edinburgh).
SAMUEL CARTWRIGHT.	J. R. BROWNLIE (Glasgow).
MORTON A. SMALE.	J. H. WATFORD (Eastbourne).
J. HOWARD MUMMERY.	F. H. BALKWILL (Plymouth).
ARTHUR S. UNDERWOOD.	GEORGE BRUNTON (Leeds).
C. J. BOYD WALLIS.	
E. G. BETTS.	
J. F. CORBETT.	

EXTRACTS FROM THE BYE-LAWS.

Objects and Constitution of the Society.

This Society is instituted for the encouragement and diffusion of knowledge in Dental Surgery, and for the promotion of intercourse among members of the Dental Profession

The Society shall consist of resident, non-resident, corresponding, and honorary members.*

1. The resident members shall consist of gentlemen practising as Dental Surgeons in London, or within ten miles of General Post Office, St. Martin's-le-Grand.
2. The non-resident members shall consist of gentlemen practising as Dental Surgeons, residing beyond ten miles from London.
3. The corresponding members shall consist of distinguished gentlemen practising as Dental Surgeons, residing in the Colonies of Great Britain, or foreign countries.
4. The honorary members shall consist of distinguished practitioners of Dental Surgery who have retired from practice, of distinguished medical practitioners, and of gentlemen distinguished in any department of science.

Persons who advertise in the public journals or by circular, either their profession or their professional attainments, or public appointments, or anything relating to their mode of practice or charges, or who expose for public inspection specimens of operative or mechanical Dentistry, or conduct their practice in any way which, in the opinion of the Council of this Society, is derogatory to the respectability of the profession, shall not be considered eligible for nomination as members.

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* The following bye-law has come into force: "That on and after November 1st 1882, candidates for the Resident, Non-Resident, or Corresponding Membership of the Society, shall not be eligible unless they practise as Dental Surgeons, or are interested in the progress of Dental Surgery, and are also Licentiates in Dental Surgery, or qualified Practitioners of Medicine or Surgery; or possess such a Diploma or Degree as, in the opinion of the Council, will qualify them for the Membership of the Society."

No person being the proprietor of a secret remedy, or holding a patent relating to the requirements of Dental practice, shall be a member of this Society.

Election and Admission of Resident and Non-Resident Members.

Recommendations for resident members shall be signed by two members from personal knowledge, and by two or more from general knowledge. Recommendations for non-resident members may be signed by one member only from personal knowledge, and by two or more from general knowledge.

All recommendations for resident or non-resident members shall be submitted to, and approved of, by the Council, before being proposed to the Society for ballot.

Contributions of Members.

Every person elected a resident member shall pay three guineas as an admission fee, and an annual subscription of two guineas, *in advance.*

Every person elected a non-resident member shall pay two guineas as an admission fee, and an annual subscription of one guinea, *in advance.*

The entrance fees and first annual subscription shall be paid on admission, and the subsequent annual subscriptions in the month of November in each year; but new members proposed at or after the annual meeting, shall not be required to pay any subscription for the current session.

Ordinary Meetings.

The ordinary meetings of the Society shall be held on the first Monday in each month, from November to June, both inclusive, at 8 p.m. precisely, except in the month of January.

Each member may introduce two visitors at these meetings, on writing the visitors' names in a book to be kept for that purpose. The same visitors shall not be admitted more than three times during one session.

Annual General Meeting.

The annual general meeting of the Society for the election of the officers and councillors, &c., shall be held on the evening of the second Monday in January every year.

Society's Transactions.

The Transactions of the Society, under the designation of "Transactions of the Odontological Society of Great Britain," shall be printed at such times and in such manner as the Council shall direct.

The "Transactions" shall be presented to all resident and non-resident members of the Society who have paid their annual subscriptions.

ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.

30, Chambers Street, Edinburgh.

President—W. Bowman MacLeod, L.D.S., Ed., F.R.S.E.

Vice-Presidents.

W. Herbert Williamson, L.D.S., Ed., M.D., D.D.S.
John Austin Biggs.

Treasurer—Malcolm Macgregor, L.D.S., Edin.

Secretary—John S. Amoore. L.D.S., Eng.

Curator and Librarian G. W. Watson, L D.S., Edin.

Council.

Andrew Wilson, L.D.S., Ed. E. A. Cormack, L.D.S., Ed., L.R C.P. & S. Ed. James Mackintosh.
John Moore Lipscombe, L.D.S., Eng., Kilmarnock.

Ordinary Meetings.—The Society meets on the second Thursdays of November, December, January and February, and the 13th March.

EXTRACTS FROM THE CONSTITUTION AND LAWS.

Name and Objects.

The Society shall be named the "Odonto-Chirurgical Society," and shall have for its objects the Promotion and Diffusion of Knowlege in matters connected with Dental Surgery; the furtherance of communications on such subjects by Members of the Society; and otherwise to advance the interests of Dental Surgery as a branch of medicine.

Ordinary and Honorary Members.

The Society shall consist of Ordinary, Honorary, and Corresponding Members:

The Ordinary Members shall consist of Gentlemen practising as Dentists in Great Britain, and of Medical and Surgical Practitioners interested in Dental Surgery.

The Honorary and Corresponding Members shall consist of Gentlemen practising Dentistry in Great Britain, in the Colonies, or in Foreign Countries, and of retired Dental Practitioners in Britain, as well as such Medical or generally Scientific men as may have distinguished themselves in connection with Dental Surgery.

The Ordinary Members shall have vested in them the Government of the Society, and all cases not otherwise specified shall be decided by them by a majority of votes, by ballot, if required.

Obligations of Members.

No Member shall be permitted to advertise his profession, his modes of practice, or his charges, either in the public journals or by circular. They shall not be permitted to expose specimens of their work for public inspection, nor to carry on their practice in connection with any other business, nor to hold any patent relating to Dental practice, nor to conduct themselves in any way which the Society may consider derogatory to the Profession, so long as they continue Members of the Society. But Members who practise in towns other than that in which they reside shall be allowed to intimate their visits; such intimations being subject to the approval of the Council.

Applications for Membership.

Candidates for admission as Members of the Society shall be recommended by an Ordinary Member, and the recommendation seconded by another. After being approved by the Council, such recommendation shall be read to the Society at an Ordinary Meeting, and shall lie over to the next, when the Candidate shall be balloted for, when two-thirds of the Members present must be in his favour to secure his election.

Contributions.

Ordinary Members residing within a ten-mile radius of the City shall pay an Entrance Fee of One Guinea, and One Guinea of an Annual Subscription, in advance. All other ordinary Members shall pay an Entrance Fee of One Guinea, and Ten Shillings and Sixpence of an Annual Subscription. All Annual Subscriptions to date from the 1st of March preceding the Candidate's admission.

MIDLAND ODONTOLOGICAL SOCIETY.

OFFICERS AND COUNCIL.

Vice-Presidents.

ADAMS PARKER, L.D.S., Eng. | WILLIAM BARKLEY, L.D.S. Eng.

Sub-Editors.

ADAMS PARKER, L.D.S., Eng. | WILLIAM J. WATSON, L.D.S., Edin.

Hon. Secretary—WILLIAM J. WATSON, L.D.S., Edin.

Auditors—LEWIS & ATLEE, Chartered Accountants.

Council.

H. R. Fryer Brookes, L.D.S.I.
S. F. Clark, L.D.S.I.
T. M. Cottam, L.D.S.I.
F. Dally, L.D.S.I.
Horatio Jones, L.D.S.I.
Harry Owen, L.D.S.I.
Richard Owen.
Edwin Roberts, L.D.S., Glas.
J. E. Sutton, L.D.S.I.
James Williams, L.D.S., Eng.

Extracts from the Bye-Laws.

Days and Place of Meeting.

The members can meet on the first Thursday in January, February, March, April, May, October, November, and December, in the Rooms of the Society, at the Medical Institute, Edmund Street, Birmingham.

Name and Objects.

This Society is called "The Midland Odontological Society," and is strictly non-political in its character, being instituted for the elevation of the Profession by the promotion and diffusion of scientific and practical knowledge in matters pertaining to Dental Surgery, the encouragement of social intercourse among the members of the Profession and collateral Sciences, and the furtherance of the interests of Dentistry as a branch of General Surgery and Medicine.

Constitution.

The Society shall consist of members, honorary members, and associates.

(*a.*) The members shall consist of gentlemen legally entitled to practice Dental Surgery.

(*b.*) Corresponding members shall consist of distinguished gentlemen, practising as Dental Surgeons, residing in the Colonies of Great Britain or in Foreign Countries.

(*c.*) Honorary members shall consist of distinguished Dental Surgeons who have retired from active practice, and of Medical Practitioners whose names appear in the Medical Register; and of gentlemen distinguished in any department of science.

(*d.*) Associates shall consist of Dental students, articled pupils, and assistants.

Any gentleman desirous of becoming a member of this Society must sign and deposit with the Secretary a declaration.

Subscriptions.

The subscription shall be, for members, half a guinea per annum; for associates, five shillings per annum. The subscriptions to date from the day of election and from the 1st of January in each subsequent year, and shall be paid in advance.

Publication of Transactions.

A copy of all papers read before the Society must be deposited with the Hon. Secretary, in such form as the Council may from time to time direct. Such copy shall become the property of the Society, to be dealt with at the discretion of the Council, who shall form a Standing Committee to determine upon the publication and form of publication of the Society's Transactions.

Donations to the Society.

Any person who shall present books, money, specimens, or other property to the Society, shall be considered a benefactor thereof, and shall have his name and a description of the gift recorded in a book kept for the purpose. The yearly entries of such books shall be read at the Annual General Meeting.

Life Members.

A donation of ten guineas in one sum shall constitute a life member of the Society, subject to Bye-Law III., and the consent of the Council, the Donor being entitled to all the privileges of other members.

Visitors.

Each member or associate may introduce two visitors at these meetings, but the same visitor shall not be admitted more than *twice* in one year. All visitors must sign the Visitors' Book kept by the Secretary.

Annual General Meeting.

The Annual General Meeting of the Society, for the election of Officers and Council, the alteration and amendment of the Bye-Laws, and other business, shall be held in Birmingham, on the first Thursday in February.

The Property of the Society.

The whole of the Society's property and effects, of whatever kind soever, shall be vested in and placed under the direction and management of the Council, subject to the consent of General Meetings of the Society.

THE BRITISH DENTAL ASSOCIATION.

(*Incorporated June 3rd,* 1880.)

40, LEICESTER SQUARE, LONDON, W.C.

President—Sir Edwin Saunders, F.R.C.S.

President-Elect—J. R. Brownlie, L.D.S., Eng.

Treasurer—James Parkinson, L.D.S., Eng.

Representative Board.

President—Sir John Tomes, F.R.S., F.R.C.S., L.D.S., Eng.

Vice-President J. Smith Turner, M.R.C.S., L.D.S., Eng.

For London.

T. J. Hutchinson, M.R.C.S., L.D.S., Eng.
S. A. Rogers, M.R.C.S., L.D.S., Eng.
H. E. Sewill, M.R.C.S., L.D.S., Eng.
C. S. Tomes, F.R.S., M.A., Oxen., M.R.C.S., L.D.S., Eng.
Storer Bennett, F.R.C.S., L.R.C.P. Lond., L.D.S., Eng.
Claude Rogers, D.M.D., M.R.C.S., L.D.S., Eng.
Morton Smale, M.R.C.S., L.D.S., Eng.
T. Underwood, L.D.S., Eng.
T. Charters White, M.R.C.S., L.D.S., Eng.
A. J. Woodhouse, L.D.S., Eng.
S. Cartwright, F.R.C.S., L.D.S., Eng.
W. H. Coffin.
G. W. Parkinson, M.R.C.S., L.D.S., Eng.
J. H. Mummery, M.R.C.S., L.D.S., Eng.
Felix Weiss, L.D.S., Eng.

For the Provinces.

Fenn Cole, L.D.S., Eng., Ipswich.
G. Cunningham, D.M.D., Cambridge.
T. Mahonie, L.D.S.I., Sheffield.
R. Rogers, L.D.S.I., Cheltenham.
S. Wormald, L.D.S.I., Stockport.
J. R. Brownlie, L.D.S., Eng. Glasgow.
G. Brunton, Esq., Leeds.
R. F. H. King, L.D.S., Eng., Newark.
R. T. Stack, D.M.D., F.R.C.S.I., M.D., Dublin.
W. H. Williamson, M.D., L.D.S., Edin., Aberdeen.
F. H. Balkwill, L.D.S., Eng., Plymouth.
J. A. Biggs, Glasgow.
C. H. Bromley, M.R.C.S., L.D.S., Eng., Southampton.
T. E. King, L.D.S., Eng., York.
C. Sims, L.D.S., Eng., Birmingham.

Ex-Officio Members.

A. M. MATTHEWS, L.D.S., Eng , *President.* W. H. WAITE, D.D.S., L.D S.I., *Hon. Sec.*	Midland Counties Branch.
GEO. C. MCADAM, D D.S., Eng., *President.* H. B. MASON, L.D.S., Eng., *Hon. Sec.*	Western Counties Branch
R.H WHITE,M.R.C.S ,L.D.S.,Eng.,*President* W. A. RHODES, L.D.S.I., *Hon. Sec.*	Eastern Counties Branch.
WALTER CAMPBELL, L.D.S., Eng., *President.* W. B. MACLEOD, L. D.S., Edin., *Hon. Sec.*	Scottish Branch.
W. S. WOODBURN, L. D.S., Glas., *President.* W. F. MARTIN, L.D.S., Glas., *Hon. Sec.*	West of Scotland Branch.
F. E. HUXLEY, M.R.C.S., L.D S., Eng. *President* W. H. B. NEALE, L.D.S.I., *Hon. Sec.*	Central Counties Branch.
S. LEE RYMER, L.D S., Eng., *President.* J. DENNANT, L.D.S., Eng., *Hon. Sec.*	Southern Counties Branch.

FREDERICK CANTON, M.R.C.S., L.R.C.P., Lond., L.S.A., L.D.S., Eng.
Hon. Secretary.

Extracts from Memorandum of Association and Bye-Laws.

The objects for which the Association is established are the promotion of Dental and the allied sciences, and the maintenance of the honour and the interests of the Dental profession by

"The Periodical meetings of the Members of the Association and of the Dental profession generally, in different parts of the country.

"The publication of a periodical journal, and by

"The maintenance of the spirit and provisions of the Dentists' Act, by such lawful means as may be necessary, etc., etc."

Extract from Bye-Laws.

4. A person who is registered in the Dentists' Register shall be eligible for election as a member of the Association, provided he be of good character; that he does not conduct his practice by means of the exhibition of Dental specimens, appliances, or apparatus in an open shop, or in a window, or in a show-case exposed to public inspection; or by means of public advertisements or circulars, describing modes of practice, or patented or secret processes; or by the publication of his scale of professional charges.

5. Any registered Dental practitioner who can subscribe to a declaration (provided by the Association) embodying the preceding Bye-law, and who shall be recommended as eligible by any three members of the Association, may be elected a member by the Representative Board, or by a committee appointed for that purpose by that Board, or by the Council of a recognised Branch.

The subscription is One Guinea per annum, and each member is entitled to a copy of the Journal of the Association monthly, and to attend the Annual Meetings of the Association.

Forms of application for membership may be had of the Hon. Sec., 40, Leicester Square, London, W.C.

BENEVOLENT FUND OF THE BRITISH DENTAL ASSOCIATION.

Chairman—SIR JOHN TOMES, Esq., F.R.S. (Pres. of the Representative Board).

Trustees.

SIR EDWIN SAUNDERS, London.
JAMES PARKINSON, Esq. London.
RICHARD ROGERS, Esq., Cheltenham.

Hon. Treasurer—A. J. WOODHOUSE, Esq.

Committee of Management.

J. DENNANT, Esq., Brighton (Vice Chairman).
S. J. HUTCHINSON, Esq., London.
S. LEE RYMER, Esq., Croydon.
W. H. WAITE, Esq., Liverpool.
GEORGE WM. PARKINSON, Esq., London. (Hon. Sec.)

BRITISH DENTAL ASSOCIATION.
WESTERN BRANCH.

Officers, 1886–7.

President—J. T. Browne-Mason, L.D.S., Eng.

President-elect—E. Apperly, L.D.S., Eng.

Vice-Presidents.

George Parkinson, L.D.S., Eng.
T. Cooke Parson, M.R.C.S., Eng.
Richard Rogers, L.D.S.I.
Chas. Gaine, M.R.C.S., Eng.
W. A. Hunt, L.R.C.P., M.R.C.S., Eng.
Geo. C. McAdam, L.D.S., Eng.

Hon. Treasurer—J. T. Browne-Mason, L.D.S., Eng.

Council.

E. Apperly, L.D.S., Eng.
F. H. Balkwill, L.D.S., Eng.
C. Spencer Bate, F.R S., L.D.S., Eng.
J. Rogers Bate, L D.S.I.
E. L. Dudley, L D.S., Eng.
H. P. Fernald, L.D.S.I.
C. A. Hayman, L.D.S., Eng.
W. Helyar, L.D.S.I.
A. G. Levason, L.D.S.I.
H. Mallet.
W. V. Moore, L.D.S., Eng.
R. P. Morrison, L D S.I.
G. B. Pearman, L.D.S., Eng.
A. Smith, L.D.S.I.
A. B. Verrier, L.D.S.I.
E. N. Washbourn, L.D.S., Eng
F. Youngman, L.D.S., Eng.

Hon. Sec.—Henry B. Mason, L.D.S., Eng.

A person who is registered in the Dentists' Register shall be eligible for election as a Member of this Branch, provided he be of good character; that he does not conduct his practice by means of the exhibition of Dental specimens, appliances, or apparatus in an open shop, or in a window, or in a show-case exposed to public inspection; or by means of public advertisements; or circulars describing modes of practice, or patented or secret processes; or by the publication of his scale of professional charges.

Any Dental practitioner, who can subscribe to the conditions laid down in Bye-law 4, who has been recommended as eligible by any three members of this Branch, may be elected a Member by the Council, and shall be admitted a Member of the British Dental Association.

THE MIDLAND BRANCH OF THE BRITISH DENTAL ASSOCIATION.

President—A. M. Matthews, L.D.S., Bradford.

President Elect—F. Bullen, L D.S., Chester.

Treasurer—S. Wormald, L.D.S.I., Stockport.

Hon. Sec.—W. H. Waite, L.D.S.I., Liverpool.

Council.

H. Campion, M.R.C.S., Manchester
E.H. Williams, L.D.S., Manchester
Roff King, L.D.S.I ,Shrewsbury.
T. Murphy, L.D.S.I., Bolton.
J. Renshaw, L.D.S.I., Rochdale.
G. Brunton, Leeds.
T. Mahonie, L.D.S.I., Sheffield.
D. A. Wormald, L D.S.I., Bury.
I. L. Pike, Sheffield.
W. E. Harding, Shrewsbury.
H. Blandy, Nottingham.

Composed of Members of the British Dental Association who reside in the Midland and North Western Counties of England, and of Associates who can fulfil the conditions laid down in the Bye-laws. The Annual Meeting takes place in April.

EXTRACT FROM BYE-LAWS.

2. The Association shall consist of Members and Associates. No one shall be eligible for membership who is not already a member of the British Dental Association. Any registered Practitioner of good character, who does not conduct his practice by means of the exhibition of Dental specimens, appliances, or apparatus in an open shop, or in a window, or in a show-case exposed to public inspection; or by means of public advertisements, or circulars describing modes of practice; or patented, or secret processes; or by the publication of his professional qualification, or scale of professional charges, may be admitted as an Associate. Associates shall be entitled to all the privileges of the Branch Association, but shall not be entitled to vote, or hold office therein.

3. Any Member of the British Dental Association may be elected a Member of the Branch by the Council of the Branch, at any of their Ordinary Meetings, on his sending a written application for election to the Secretary of the Branch.

4. Any registered Practitioner who can subscribe to the conditions laid down in Bye-law 2, and who shall be recommended as eligible by any three Members or Associates, may be elected an Associate by the Council, on his forwarding the recommendation and his subscription to the Honorary Secreary of the Branch.

BRITISH DENTAL ASSOCIATION.

EASTERN COUNTIES' BRANCH.

OFFICERS.

President.—R. W. WHITE, M.R.C.S., L.D.S. Eng., Norwich.
President Elect—H. W. TRACEY, L.D.S. Edin., Bury St. Edmunds.
Treasurer—J. B. BRIDGMAN, L.D.S.I., Norwich.
Hon. Sec.—W. A. RHODES, L.D.S.I, Cambridge.

Council.

J. FENN COLE, L.D.S. Eng., Ipswich.
G. CUNNINGHAM, B.A., D.M.D., Cambridge.
FRANK HALL, L.D.S.I., Hertford.
B. W. HARCOURT, ESQ., Norwich.
ALEX. KIRBY, L.D.S. Eng., Bedford.
A. L. LITTLEBOY, ESQ., Norwich.
R. PAYLING, ESQ., Peterboro'.
T. H. WHITE, M.R.C.S., L.D.S. Eng., Lincoln.

DISTRICTS.

Norfolk, Suffolk, Cambridgeshire, Essex, Lincolnshire, Northamptonshire, Huntingdonshire, Bedfordshire, and Hertfordshire.

BYE-LAWS.

1. Any person registered in the Dentists' Register shall be eligible for election as a member of this Association provided he be of good character, that he does not conduct his practice by means of the exhibition of Dental specimens, appliances, or apparatus in an open shop, or in a window, or in a show-case exposed to public inspection; or by means of public inspection; or by means of public advertisements or circulars describing modes of practice, or patented or secret processes; or by the publication of his scale of professional charges; or by the assumption of any title, degree, or diploma not recognised by this Association.

2. Any registered Practitioner, not disqualified by any bye-law, who shall be recommended as eligible by any three members of the Association (one being from personal knowledge) may be elected a member by the Council, the election to be by ballot, three black balls to exclude.

THE STUDENTS' SOCIETY OF THE DENTAL HOSPITAL OF LONDON, LEICESTER SQUARE, W.C.

President—Geo. W. Parkinson, M.R.C.S., L.D.S.
Vice Presidents.
S. C. Buckland, M.R.C.S., L.D.S. | H. Parkinson, L.D.S.
Treasurer—H. Lloyd Williams, M.R.C.S., L.D.S.
Hon. Secs.
W. J. England, L.D.S. | Chas. F. Rilot, L.D.S.
Curator and Librarian—J. F. Colyer.
Councillors.

2nd Year.	*1st Year.*
A. T. Croucher.	A. P. Cotes.
A. Kendrick.	R. Ackland.
G. O. Whittaker, L.D.S.	T. S. Rendall.
H. Williams.	G. Seymour.
T. H. G. Wrighton, L.D.S.	

The object of the Society is the consideration of matters generally and specially appertaining to Dentistry. The affairs of the Society are managed by a Council consisting of a President, two Vice-Presidents, Treasurer, two Secretaries, Curator, and nine other members. The President is chosen from the past Students who have obtained their degree of L.D.S.; the Vice-Presidents from past Students with or without qualification.

Any gentleman wishing to become a member, must be proposed and seconded at one meeting, and be balloted for at the next; one black ball in four to exclude. The entrance fee for Ordinary members is half-a-crown, and there is an annual subscription of the same amount.

Ordinary meetings are held at 7 p.m. on the second Monday in every month, from October to March inclusive. The annual meeting for the election of officers, and other business, is held in January of each year.

Every member has the power of introducing one visitor, not being a Student of the Hospital or school, to the evening meetings, with the consent of the President. Visitors are allowed to take part in the discussion of the papers and clinical cases.

There is a Library in connection with the Society, the Curator discharging the duty of Librarian.

The Council offer a prize, value £3 3s., at the end of each year, for the best paper read before the Society during that year.

STUDENTS' SOCIETY OF THE NATIONAL DENTAL HOSPITAL AND COLLEGE.

President—Willoughby Weiss, Esq., L.D.S., Eng.
Vice-Presidents—
Charles Glassington, Esq., M.R.C.S., L.D.S., Edin.; and
H. G. Read, Esq., L.D.S., Eng.
Hon. Treasurer and Secretary of the Council—
A. P. Penrose, L.D.S., Glas.
Hon. Secretary Fred C. Wright, L.D.S. Eng.

Council—Messrs. F. Bromley, L.D.S., Glas.; T. Fripp, L.D.S., Edin.; H. J. Kluht, L.D.S., Glas.; C. Pattinson; E. Perks, L.D.S.I.; I. Prager, L.D.S.I.

This Society, which was established March 15th, 1878, was constituted for the encouragement and diffusion of knowledge in Dental Science, and for the promotion of intercourse among its Members; and all Students of Dental Science are eligible for Membership. All Candidates for Membership must be approved by the Council before being proposed to the Society for election. The Entrance Fee is 2s. 6d., and the Annual Subscription 2s. 6d., to be paid in advance. The ordinary meetings of the Society are held on the first Friday in each month, from October to March, both exclusive, at 8 p.m. precisely. Each Member may introduce two visitors, not being Students of the Hospital or College, but the same visitors may no be admitted more than three times during one Session.

HOSPITAL REPORTS.

MONTHLY STATEMENT of operations performed at the London Dental Hospital, Leicester Square, from August 1st to 31st, 1886 :—

Number of Patients attended		
Extraction	Children under 14	514
	Adults	1061
	Under Nitrous Oxide	455
Gold Stoppings		106
Other Stoppings		312
Advice and Scaling		147
Irregularities of the Teeth		37
Miscellaneous and Dressings		310
Total		2942

CHAS. F. RILOT,
House Surgeon.

MONTHLY REPORT of the Birmingham Hospital.

Number of Patients	1202
Extractions	1065
Gold Fillings	2
Other Fillings	85
Advice and temporary Fillings	112
Irregularities	7
Anæsthetic Cases	30
Miscellaneous	40
Number of Operations	1341

W. PALETHORPE,
House Surgeon.

British Journal of Dental Science.

No. 449. LONDON, OCT. 1, 1886. Vol. XXIX.

PRESIDENTIAL ADDRESS
BY SIR EDWIN SAUNDERS,

Delivered before the British Dental Association, at the Annual Meeting, 1885.

Gentlemen, Members of the British Dental Association :—I desire, in the first place, to express my thanks for the honour you have done me in electing me your President on this interesting and remarkable occasion, on which, from the uttermost parts of the earth, her children have flocked to this little northern island to pay their homage and to attest their loyalty to our Empress-Queen. And although there cannot but be a shade of sadness over our proceedings, occasioned by the lamented absence of my predecessor, Mr. White, through serious and protracted illness, yet our, and his, consolation will be, that his place has been so ably filled by our esteemed friend Sir John Tomes, whose improved health, we are glad to know, has enabled him to volunteer a ready response to the demands on his time and attention, which have thus unexpectedly arisen.

One of the earliest, and not the least arduous of the duties with which the new President is confronted, is the delivery of an appropriate address, which, without being irrelevant, should not be devoted too exclusively to a consideration of the constitution and functions of the Association, and thus become a mere echo of addresses delivered on former similar occasions. On the other hand, it should not be alien to the pursuits and interests of the assembled members of the Association. With these feelings, I desire to propitiate your indulgence in the few words I am about to address to you, if they differ, as they may do in some respects, from what is customary, and from what you may be justly entitled to expect ; and, in order to effect this propitiation, it is only right that you should be made aware of the reasons which seem to justify this departure from established usage. Two considerations especially conspired to render this innovation imperative. First, the Association having now entered on its second lustrum, the story of its birth and development, its constitution and functions, has necessarily been so often the theme of my predecessors in this chair, and has been treated in so able and exhaustive a manner, that it would now be tedious as a twice-told tale ; and, secondly, having observed at the last very successful and interesting meeting at Cambridge, that ladies were found to grace our proceedings with their animating and approving presence, without exhibiting (whatever they may have felt) symptoms of weariness, it seemed to me that it behoved us, at least, to endeavour to avoid being tedious, and to seek to escape for a time out of the narrow and strictly professional groove. In what I shall have to say, therefore, it will be my aim to take a somewhat broader view of the social changes that have happened since the institutions connected with our speciality came into existence, though without losing sight of their more immediate application to dental surgery ; and I am further emboldened to make this innovation upon established custom, by the favour with which the attempt to add an extra-professional department of art products, with a charitable object, was received at our last meeting. Thus it will not be necessary to dilate at any length, on the advantages of an association such as that to which it is our privilege to belong ; in the kindling of friendships among members of the same profession, where in its absence there might be groundless jealousies and misapprehensions, which disappear on a better and truer acquaintance with each other ; in the opportunity thus afforded of the diffusion of technical knowledge, and of imparting many a valuable hint in practice, or of fertile suggestion in treatment, containing, it may be, the germ of some great improvement, but which might otherwise be consigned to the limbo of unfructified thought ; in fostering a feeling of brotherhood, and of generous and unstinting appreciation of what is good in others ; of a chivalrous *esprit de corps*, which would render anything mean or of the nature of detraction simply impossible ; of enforcing that higher ethical standard, in short, which makes each individual feel that the honour of the profession to which he belongs is for the moment in his charge, in a sense, and to an extent unintelligible where no such organisation exists. Nor need we do more than glance at the not unimportant uses of such associations, in protecting alike the public and the profession from the incursions of the unworthy and rapacious—the hirelings, not true shepherds—who, not being qualified to enter by the door of certificated competency, have contrived to climb over some other way ;

in providing a Journal as a means of communication between members of the profession in this country and throughout the world, thus introducing novel plans of treatment, or modifications of known processes or remedies, and so of determining their value, and assigning them their true place, by subjecting them to the test of collective investigation, or, finally, by arranging these very agreeable annual meetings, at which, as at some intellectual tournament, the thinkers and workers of the profession who are not content to do simply what has been done, come into the arena, throw down the gauntlet, and challenge all comers in defence of their supposed new fact in biology, their new method of treatment, or their new theory of disease. Nor shall I occupy your time in pointing out the social aims of association as inducements to human intercourse, and the concomitant and incalculable blessings which flow from the friendship and the encouraging sympathy of our fellow men. For if there should still be any members of the profession who, after the report of the brilliant receptions at Plymouth, at Edinburgh, and at Cambridge, still hold aloof and decline to join the Association, I am quite sure they would not be amenable to any arguments that I could adduce, or any eloquence that I could command.

With this prefatory explanation, I may now address this audience in more courteous and correct fashion, as :—Ladies and Gentlemen : If we were suddenly called upon to designate the chief characteristic of the age in which we live, to express, by a phrase, or by a single word, the great need of our common humanity at the present time—a need of which we are all more or less conscious, for the most part with a dim and dumb consciousness, but in regard to which aspirations are never wholly absent—we should, I think, exclaim with the dying Goethe, "Light, more light" ; light physical, and light intellectual. And it is not a little remarkable that this need in both kinds should have simultaneously found satisfaction ; that the various and brilliant applications of electricity in aid of both sight and sound, the capturing and subjugating to our use and service the blinding and devastating lightning's flash, should synchronise with an unparalleled development of scientific research, and with the multiplication and improvement of the means of wide diffusion of such results. The multiform and marvellous applications of this most subtle and fugitive of elements must be regarded as among the grandest achievements of our time. Giving, under normal conditions and in a state of equilibrium, no evidence of its existence, and yet pervading all forms of matter, whether solid or gaseous, and under certain conditions profoundly affecting the state of the atmosphere by which we are surrounded, not seldom suddenly dealing death and destruction to animal and vegetable organisms, and ruin to the noblest monuments of human genius, it can yet be subordinated to the use and convenience of man. We are all familiar with the startling and instantaneous revelation to the eye of minute objects, under a momentary flash of lightning, which would be unobserved in ordinary daylight, and with the vividness and truth with which all tints and shades of colour are reproduced. When to these two qualities the searching and pervading character of the light, and its absolute colourlessness, by which natural colours remain unchanged and unvitiated under its influence, another most valuable quality is added—that of its not requiring oxygen for its sustentation (in which it is most favourably distinguished from all other forms of artificial illumination), it will at once be seen how valuable an addition has been made to the forces of nature which have been brought under man's control. For with all other forms of light, as the result of combustion there must necessarily be contamination of the atmosphere, more or less disastrous to health and respiration, arising both from consumption of the oxygen in the air, and from noxious products of the processes of producing illumination. It was a happy thought, therefore, and a great step in science, to seize the perfect light in the flash of lightning, to rob it of its terrors and to subjugate it to human control, to make it subservient to human convenience. It was another and by no means the least important of those applications of scientific discovery to the needs of daily life, of which this latter half of the nineteenth century has furnished so many and striking examples. But the idea was of slow birth and evolution. The unknown is always full of terrors, and superstitions die hard ; and it was not till long after science had elucidated the true nature and origin of those atmospheric convulsions, which an exaggerated idea of the Divine superintendence of mundane affairs attributed to a manifestation of the anger and vengeance of the Almighty, for the nation's sins and shortcomings ; it was not till long after this idea was exploded, that it occurred to anyone to endeavour to render this wild and apparently untameable force amenable to human service and convenience. Nor is it a mere figure of speech to speak of the electric spark and the lightning flash as identical in origin and nature; for, as we all know, they are both due to the energy with which electricity seeks a return to equilibrium or a state of rest. That when, for example, two masses of cloud approach each other, which under ordinary conditions would each contain 100 parts of electricity, no effect would be produced; but if, from whatever cause, one of these clouds should hold only 50 parts, and the other 150 parts, being 50 parts in excess of the normal amount, the energy with which restitution would be made, when they come within what is called striking distance, and with a dry atmosphere, would give rise to the convulsion of nature known as a thunderstorm. And we all know that such convulsion of nature may be avoided by, if practicable, making a metallic communication between these masses of cloud, or between the cloud and the earth, by which the transference of this excess of electric force is facilitated, as is seen in the ordinary lightning-conductor, and thus the normal state is restored without the development of heat and light. If, however, the metallic rod, or wire, is insufficient to carry the amount of electricity, it will be burnt up in the process. By observing these conditions, storing up electricity in excess by batteries, or better still, by dynamo machines, actuated by steam or gas; by providing iron or copper wires of sufficient conducting power to convey away this surplus electric force, and so again to establish the normal condition or equilibrium; and by making breaks in this conducting wire and inserting in such breaks a thin thread of platinum, or other indestructible matter, which becomes incandescent by reason of its insufficient calibre and conducting power, a light of unequalled purity and intensity is obtained; a light which is constantly spoken of as, and doubtless is destined to be, the light of the future; but which at present, and probably for some time to come, from the cumbrous and costly process by which the electricity is obtained and accumulated, will have to be reckoned among the luxuries of social life. Meanwhile, its numerous advantages over other illuminants, as regards human health and comfort, are made evident by its use in theatres, halls, churches, and places of public resort. And it is no matter for surprise, that the intellectual activity which is so characteristic of the present time, especially with regard to medical science, should have seized upon so valuable an ally in treatment or diagnosis. Accordingly, various novel and ingenious adaptations have from time to time been given to the profession, for throwing light into the cavities and dark corners of our organisation, by which the nature and site of lesions have been discriminated with more accuracy than was possible without such aid, and by which also operations could be performed, and topical remedies applied, with a nicety which had been hitherto unattainable. Such are the laryngoscope, in the treatment of throat disease, with adaptations for the ear and nose ; and the lamps (of which some of the best, by Messrs. Ash and others, may been seen at the Dental Hospital), for illuminating the oral cavity. Of the other known uses of this youngest and fairest of Nature's forces—its therapeutic value in the treatment of neuroses and of paralysis ; as an unerring and swift messenger for the conveyance of our wishes or our most tender thoughts, nay, even the cherished tone of voice to distant parts ; and probably, at no very remote date, as a means of transporting ourselves with safety and celerity—we may not now speak, for time passes, and if I would keep my promise not be tedious, must touch but lightly, and only on the outer edge and fringe, as it were, of that other great and entrancing subject, light intellectual.

It is always difficult, not seldom impossible, to fix the date of a new departure, or of an original discovery ; for, whenever it bursts upon the world, some one will be found ready to point out that the present promulgator was anticipated by some investigator of a former age, or that some faint adumbration of the supposed new idea may be detected in some long-forgotten archives. But we should not, probably, be far wrong in assigning to the first great International Exhibition of 1851, the occasion on which the first beams of that quickening and illuminating effulgence began to exercise an influence on the social life of this country. That great event would seem to have furnished the initial impulse towards progress which has continued to the present time, and has made itself felt in every department of the national life. Parliamentary representation has undergone modifications, with the view of bringing it more into harmony with the growing intelligence of the people ; the National Church has had infused into it a more sympathetic spirit, both in its architecture and ceremonial ; legal proceedings have been simplified ; the army has been remodelled ; the wooden walls of old England have been replaced by turret-ships and iron-clads, and the traditional British sailor has given place to the skilled engineer. In no department of the national polity is the spirit of progress more evident than in that which concerns itself with education; and much, indeed, has been accomplished in this direction, with the view of satisfying the popular cry for more light. Not to speak of Board Schools and State education, and the social revolution to which it is giving rise—or of the incursions into man's sphere of work by an epicene section of the fairer half of mankind, who are no longer satisfied with the empire of the home and of the heart—our whole educational system has been fundamentally modified and re-arranged. Science has at length conquered for itself a place and recognition in our seats of learning, and now divides the throne with literature and classic lore. All kinds of knowledge are made more accessible by improved methods of teaching, by the indefinite multiplication of popular lectures, or by hand-books and journals of an ever-teeming press, investing lines of study which had come to be regarded as rugged and arduous, with a charm and an interest which they had hitherto not been supposed to possess, and which give a new emphasis to the poet's words:—

"How charming is divine philosophy,
Not harsh and crabbed, as dull fools suppose;
But musical as is Apollo's lute,
And a perpetual feast of nectar'd sweets."

Nor has the change been less marked in matters medical. Sanitary science has arisen, and people have learned much concerning the laws of nature, and how to manage their own health. More intelligent care is given to diet, less reliance placed in drugs, the teachings of modern medicine being directed rather to the promotion of health than the cure of disease. Nor should we forget that last best gift to suffering humanity—that crowning glory of the Victorian era—the abolition of pain by anæsthetics, by which the sum of human misery has been indefinitely lightened, under operations by which life is prolonged, or again made glad, which would otherwise have been impossible.

And if surgery can point to its triumphs, in a greatly diminished mortality from severe operations, whether due to increased care in the antiseptic after-treatment, or to the avoidance of shock to the system by the resort to anæsthesia, medicine can also boast of the additions to its armamentarium of numerous valuable aids to diagnosis. Such are the stethoscope in lung disease, or affections of the heart; the sphygmograph, which not only records with unerring accuracy the frequency, but the peculiar form and rhythm of pulse-beat; the laryngoscope for throat disease, and various chemical tests and instruments for determining the temperature. I say nothing here of germ theories of disease, or of treatment or prophylaxis by inoculation, as being a subject still, to a certain extent, *sub judice;* what is of greater interest to us, is, that this same wave of intellectual light has not been without its influence on our own speciality. Whether we direct our attention to the facilities afforded by the schools in connection with the dental hospitals, or to the improved construction and preparation of instruments, materials, and appliances, we cannot fail to be struck with the progress which has taken place, and it will always redound to the credit of our speciality that it was privileged to give to a grateful world the inestimable boon of anæsthesia.

The dominant idea of the organisers of that Exhibition, and of that wise philanthropist, the late Prince Consort, under whose fostering care it prospered, was to popularise art. Not so much to encourage the production of what is rare and costly (though this was not neglected), as to bring artistic treatment into matters of daily life. A conscious desire for emancipation from the monotonous and sombre uniformity of the routine of daily life, began to manifest itself among the people of this country, and it then occurred to that sagacious prince—always mindful of the precept, " not to look on our own, but also on the things of others"—that apostle of altruism of the best kind—to invite all the nations of the earth to bring their best products and possessions to our midst, for mutual advantage, comparison, and improvement. How this was responded to, and with what far-reaching and stupendous results—in the purifying and elevation of taste in our pottery, china, and metal work, in our furniture and the decoration of our dwellings, in our domestic architecture, and all the details of daily life ; what an impulse was given to progress of every kind ; what rays of intellectual light were thus opened out, of light which can never be quenched—is now matter of history. But it was not only, or even chiefly, as a revelation of beauty under our dull skies ; it was not only as a collocation of the art marvels of sculpture and painting from Rome and Florence ; of the beautiful and expressive wood-carving, the ornate metal work, and the tuneful chimes of Belgium ; the tapestries and china, the perfect drawing, the exquisite colouring, and the thousand elegancies of France ; the erudition, the culture, and the more severe forms of art of Germany, that it possessed an interest of its own for us, but rather for its teaching power. Not only was the eye regaled with results, but the processes by which those results were obtained were shown and explained. A death-blow was thus dealt to the old exclusive system by which the arcana of any trade or craft were jealously guarded from the neophyte. Handicrafts had indeed been for the most part described as "mysteries," and it was only after long and hard service as apprentices, that the pupils were permitted to snatch furtive glimpses into the penetralia of the craft. And in our own profession, not only did this system prevail amongst the apothecaries, but, even within living memory, in the highest ranks of the profession, it was no uncommon thing for a large premium to be paid to a leading consulting surgeon, with the implied expectation of the reversion of a hospital appointment. Such a scandalous state of things, with the nepotism to which it gave rise, and the consequent discouragement to the diligent student, is happily now no longer known. And here I cannot help pausing for a moment to contrast the state of things in our own speciality as I and my contemporaries found it, with that which is presented this day to those who have had the wisdom to avail themselves of the opportunities afforded them by becoming members of the Association. At the time to which I refer, the only hospitals which recognised our speciality, so far as to institute a department of dental surgery, were Guy's, presided over by Mr. Thomas Bell, well known as a professor of natural history, as well as a distinguished member of the profession; and St. Thomas', of which I was the first incumbent. At each institution a short and somewhat elementary course of lectures was given, our experience being that, the majority of the class being about to embark in general practice, they were not disposed to devote much time to more detailed instruction. This, with attendance on one morning in each week for operative practice—consisting almost solely of extractions, with an inconvenient chair, a bad light, and worse instruments, in an out-of-the-way corner of the out-patients' department—constituted almost the only means of acquiring the requisite skill and knowledge for the practice of dental surgery. It is true that the system of apprenticeship before alluded to, was in force, but the time devoted to becoming qualified by this means, consisted for the most part of mechanical drudgery in the construction of artificial arrangements, with but rare and scant opportunities of operating, or of witnessing operations on the living subject. So great was the difficulty, indeed, of getting to know the method of work of an eminent member of the profession, that men were fain to make themselves patients, and thus obtain a surreptitious and necessarily imperfect knowledge. What a contrast does this state of things present, with that which now awaits the members of this Association. Instead of only two hospitals with a department of dental surgery, no general hospital would now be regarded as properly equipped, which proposed to omit that important and necessary speciality. This is, so far, a matter of congratulation, as an evidence of the estimation in which our art is held by the public, and by those who have the control of such institutions, and also as ensuring more skilful and humane treatment for those among the outpatients who are afflicted with dental troubles ; but as a means of affording opportunities of education for those who propose to devote themselves to the practice of the speciality in its present advanced state, the most perfectly arranged department in a large general hospital must, necessarily, be wholly inadequate. The necessary quietness and patience, the delicacy of touch, the complexity of the processes, the finish and cleanliness of the instruments, the absence of means of draining off and diverting the deluge of saliva—fatal to the success of many dental operations—the want of good light, and other disadvantages, which will readily suggest themselves to those who have had experience in this matter, unequivocally point to the necessity of a separate hospital, and a special school for teaching purposes. How well this want has been provided for in the two dental hospitals in the metropolis, with their respective schools and professors, is attested by the number of students who annually flock to their portals for the instruction which they are so well fitted to afford. At that noble institution in Leicester Square, which has been provided and dedicated alike to the sacred cause of humanity and of education, where the highest skill and the most humane treatment are brought within the reach of the humblest and most indigent, the diligent and anxious student is invited to witness the most advanced methods of practice by distinguished operators. With a light such as is rarely to be found in London, and which is indeed all that could be desired ; with a chair admirably adapted for the purpose of supporting the patient in a favourable position with a minimum of fatigue, and which has the further merit of combining simplicity with economy ; with all the latest improvements in instruments, materials, and appliances ; with the most dexterous methods of work demonstrated by hands of acknowledged skill, we have a combination of favourable conditions for the acquisition of knowledge formerly undreamed of, and as to which it is not too much to say that it leaves nothing to be desired. And this contrast is furthermore of a satisfactory nature, as showing that our speciality has kept pace with the spirit of the time, in throwing down the barriers of exclusiveness, which formerly hindered its progress, and threatened to deprive it of its claim to be regarded as a liberal profession. Nor is it too much to assert that this broad and enlightened spirit of progress, which has culminated in the formation of this Association, may have received its initial impulse in that new departure of 1851, which has undeniably left its mark over the whole wide domain of science and of art.

DENTAL EDUCATION.*

By Morton Smale, M.R.C.S., L.D.S., L.S.A.
Dean of the Dental Hospital of London.

After speaking of the importance to the profession at large, of sound dental education, Mr. Smale said :—

The requirements of the necessary curriculum to get upon the Dentists' Register vary according to the country in which the examination is passed. It is my intention to deal only with the requirements of the College of Surgeons of England, that being the one most frequently taken, and generally admitted to be the most thorough.

The curriculum may be divided into—

a. Preliminary education.
b. Professional education.
c. Examination.

The regulations with regard to "the Preliminary" are to be obtained at the General Medical Council Office, 299, Oxford Street, several copies of which are upon the table. From these it will be seen how numerous are the opportunities for our youths to pass the necessary standard. I can hardly speak about them all, but of the more important I will say a few words, viz., the Matriculation of the University of London, the Oxford and Cambridge Local Examinations, and the Special Examination conducted by the College of Preceptors for Medical Students.

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* Abstract of a paper read before the Annual General Meeting of the British Dental Association.

The matriculation, which is held in January and June, is on all grounds the best of these—it should be passed when a youth is sixteen or seventeen without much difficulty. It possesses these advantages :—It ensures the boy receiving a fairly good education, it opens the doors to all the professions, and if at any time during his pupilage or hospital career, the student should forsake dentistry for any other branch of the healing art, it is open to him to do so, without returning to school books and passing another preliminary examination.

Let me beg of you not to advise our youth to pass the examination which is easiest ; our common frailty prompts us enough in that direction, but we all should encourage them to pass such a preliminary examination, that in their future they can contemplate it with pride and satisfaction.

The necessary preliminary having been passed, the purely professional part of the education commences by an apprenticeship to a registered dentist, in order that the mechanical side of our calling may be thoroughly mastered ; the College of Surgeons of England requires this to extend over three years. Immediately the articles are signed, the youth should register as a dental student.

No professional work is recognised by the College of Surgeons prior to registration. It is important to note this ; many heart-burnings and much trouble to officials would be saved if this simple regulation was thoroughly grasped, viz., first preliminary examination to be followed by apprenticeship and registration simultaneously.

It is impossible to over-rate this mechanical training, and three years is not a day too long to spend in a workshop to learn and master the many minutiæ of the mechanical art, without a thorough familiarity with which it is impossible to be a good dentist. I hope the day is far distant when this pupilage will be abolished.

In another country it is the custom for the mechanical training to be given at the dental school. We in England should be sorry to see this plan adopted, for we find enough to do at our schools to teach the operative part of our profession ; moreover, the mechanical part cannot be taught in classes as thoroughly or well under the personal supervision of a skilled mechanician.

There is one more danger we must avoid, the separation of our profession into two parts—operative, mechanical—this would be a fatal mistake. The successful dental mechanic is he who has a thorough practical knowledge of the anatomy of the oral cavity and its surroundings, and who is deft and clever in his digital manipulation. The successful operator is he who, in addition, has a thorough practical knowledge of the laws that govern mechanical matters. The first-rate dentist is he who combines both qualities in an unusual degree.

At the expiration of three years the hospital career should commence by simultaneous entrance at the dental and general hospital. The candidate should now register as a medical student, not necessarily to take a medical or surgical qualification, but lest at some future time he should wish to do so; the work which would be done at the general hospital for the dental qualification, and is largely the same as that required for the general qualification, need not be repeated, but the whole of the time so spent should be allowed to count as part of the medical curriculum.

This hospital work is the most serious in a student's career; he is launched into London life mostly without any influence over him, save that of his early training at home and in the workshop; in proportion as they have been thorough and earnest, as a rule is his time spent during his student days. These hospital years should be spent in real hard work in mastering every detail of the operative department. The students should seek advice from their teachers, and avail themselves of every opportunity of learning from the large experience of the members of the hospital staff, in order that each generation may progress nearer to perfection. At the general hospital let the time be spent mainly in the dissecting-room, the physiological laboratory, and the out-patient department, in which places the most practical part of the medical education is obtained. The out-patient room is not sufficiently often visited by the general student, and the attendance of the purely dental student is, I fear, nearly nil.

This brings me to examinations—class examinations, and the examination for the license in dental surgery. Of the former, I should like to say to the student, never miss an opportunity of attending these; if they consist of *viva voce* questions only, they are useful; but if in addition there is a paper to be written, they are most valuable to teach men to write papers and prepare them for the ordeal at the College of Surgeons. This latter is really very thorough, but I should like to see added to it an examination in the mechanical department, if, as I maintain, the two departments are to constitute the whole profession, and a board of examiners is to decide who is fitted to practise it, each side of the profession should be made a subject of examination.

Dental materia medica might with advantage be a subject of examination, and replace in the curriculum the ordinary course of materia medica ; this latter has virtually been removed from the double qualification schedules, and relegated to pre-hospital days.

There is yet another question of interest to us, viz., the desirability of maintaining and cementing the union between the dental and other branches of the healing art. I think we are all agreed upon this ? Nothing will strengthen this bond, as members of our department taking,in addition to the license in dental surgery, the so-called double qualification ; it will place the dentist on the same platform as the mass of the medical profession, and it would be the most practical way of showing our desire that such an end should be consummated. I should indeed be sorry to see the dental regarded as a distinct profession, already it is too much considered so by the general public. I cannot too strongly advise those who have to train young men, to persuade them to take the double qualification of the conjoint colleges of surgeons and physicians. Should this mode of procedure be adopted, I venture to predict that the progress of our vocation in the future, will be more rapid and thorough in its nature than it has ever been during the last thirty years. This advance will be of such a character that dentistry will take its place as an essential part of the great medical profession, the other branches of which will be pleased to acknowledge the dentist as a brother, pledged with them to the relief of human pain and suffering.

Increased medical and surgical knowledge is of great value, and enables us to take a larger and broader view of matters concerning oral surgery. He who spends four years instead of two at a general hospital, must have this extra knowledge.

It is urged, on the other hand, that the course I recommend takes too much time and money ; I can only ask what they weigh in the balance against knowledge and power ? Moreover, neither the time nor the money are wasted, but may be regarded as invested capital that will return an adequate interest. It is possible, also, for the student to meet this extra expenditure by taking *locum tenens* during the vacation.

Yet again it is urged, that he who devotes all his time to dentistry pure and simple, must be the best operator. This is not borne out by experience ; our best men almost invariably are those seeking the higher qualifications.

After a student has been at the hospital some time, he often evinces a desire for another qualification, and is not satisfied with the "L.D.S. only," as he calls it, and wishes to seek in another hemisphere the high-sounding title of "Dr." This appears to me to be a slight on our country. Our schools and English dentistry, all of which, I maintain, are the finest the world produces, and he who boasts the M.R.C.S., the L.R.C.P., and L.D.S., obtained by study in our best English schools, can hold his own against the world, and, if recent agitation in the medical profession ends successfully, he will be given the title of M.D.

After the preliminary examination has been passed, the student should register as both a dental and medical student; during the mechanical apprenticeship receive instruction from any registered medical practitioner, or from any pharmaceutical chemist, or at a public hospital, or infirmary, or dispensary, in chemistry, including chemical physics, practical chemistry, pharmacy, and materia medica, and present himself for examination in these before entering a hospital; or, if he prefers it, he may take the two latter later in his career, viz., at the second examination. At the expiration of his first winter, let him pass in elementary anatomy and physiology, at the end of his second winter let him take anatomy and physiology.

At the expiration of two years he may present himself for the dental license; he will, during these two years, have been attending simultaneously both the general and dental hospital. During the remainder of his time he should devote himself to surgery, medicine, and midwifery, etc., in which subjects he may be examined at the expiration of two years from the time of passing the second examination.

It was felt that the recent changes brought about by the amalgamation of the two colleges have greatly increased the difficulty of obtaining these higher qualifications; I must ask you to take my word for it that such is not really the case, the curriculum is really simplified, and a candidate now is only re-examined in the subject in which he fails. The old M.R.C.S. only, as a separate diploma, is a thing of the past; it is only advisable to deal with things as they are. I may be asked what is the extra time and money required to take these extra qualifications? It takes two more years, but the whole of these need not be necessarily spent in London. One winter and two summer sessions may be passed in one of the following ways:

(*a*) Attending the practice of a hospital, infirmary, or other institution recognised as affording satisfactory opportunities for professional study.

(*b*) Receiving instruction as a pupil of a legally qualified practitioner holding such a public appointment, or having such opportunities of imparting a practical knowledge of medicine, surgery, or midwifery, as shall be satisfactory to the two colleges.

(*c*) Attending lectures on one or more of the required subjects of professional study at a recognised place of instruction.

The twenty cases of labour can be signed for by any legally qualified practitioner.

The duties of clinical clerk and surgical dresser, which must be discharged after the second examination during six months each, can be performed at a general hospital, infirmary, or dispensary, or parochial or union infirmary, recognised for this purpose.

These arrangements make it less costly for students whose parents live in large towns where such public institutions are found ; a large proportion of the expenditure being the living in town.

The actual increased expenditure in hospital fees is about fifty or sixty guineas. The examination fees for the three examinations for the double qualification under the conjoint scheme, is thirty-five guineas.

For the convenience of reference, I should like to tabulate as concisely as possible the best mode of procedure for the dental student to obtain the three examinations :

1. Preliminary examination.
2. Apprenticeship.
3. Register as a dental and medical student, or this latter can be postponed until entry at hospital.
4. During apprenticeship receive instruction as above in chemistry, materia medica, and pharmacy, and pass in them at the College of Surgeons.
5. Enter simultaneously at a dental and general hospital.
6. Pass in elementary anatomy and physiology at end of first winter session.
7. Pass in anatomy and physiology at end of second winter session.
8. Take dental license at end of second year.
9. Devote remainder of time to medicine, surgery, midwifery, etc.

10. Pass, at expiration of two years from second examination, the final test of the two colleges.

In conclusion, I should like to point out, side by side, the requirements of the curriculum for the dental license and that for the double qualification, thus demonstrating how much of the latter curriculum must of necessity be taken by the dental student, and how few the extra subjects required.

Requirements for Double Qualifications at a General Hospital.	*Requirements for Dental License at a General Hospital.*
Anatomy—One course of lectures.	Anatomy—One course and twenty lectures on head and neck.
Physiology—One course of lectures, three months' extra practical physiology.	Physiology—One course of lectures.
Dissections—Twelve months.	Dissections—Nine months.
Surgery—One course of lectures.	Surgery—One course of lectures.
Medicine—One course of lectures.	Medicine—One course of lectures.
Materia Medica, Chemistry, Practical Chemistry—Done before entering school now.	Materia Medica—One course of lectures. Chemistry—One course of lectures. Practical Chemistry—One course of lectures.
Practical Surgery and Medicine—Three winter and two summer sessions.	Practical Surgery and Clinical Lectures—Two winter sessions.

Extra Work Required.

Midwifery—One course of lectures, and twenty labour cases.

Practical systematic instruction in medicine, surgery, and midwifery.

Instructions and proficiency in vaccination.

Pathological Anatomy—One course of lectures, and demonstrations in post-mortem room during attendance on clinical lectures.

Forensic Medicine—One course.

Clinical Lectures on Medicine—Nine months.

Clinical Lectures on Surgery—Nine months.

Clinical Study on Midwifery—Three months.

Clinical Clerk—Six months.

Surgical Dresser—Six months.

SOME NOTES UPON DISINFECTANTS AND GERMICIDES.—I. (*Concluded.*)

By Dudley Wilmot Buxton, M.D. ; B.S. Lond., M.R.C.P. ; Assistant to the Professor of Medicine in University College, London ; Administrator of Anæsthetics in University College Hospital, the London Dental, and other Hospitals.

The yeast fungus, called Torula or Saccharomyces, must be carefully separated from bacteria, from which it differs in many important particulars.

Torulæ are oval or spherical ; they each are enclosed in a membrane ; in size a torula is considerably larger than a micrococcus. Their method of development is by so-called gemmation, that is, tiny buds are seen to project from the sides of the little sphere. These enlarge, and when they have attained nearly the size of the original organism, they separate, and exist as live bodies. The function of yeast organisms is to convert sugar into alcohol, and carbonic acid gas.

There are many varieties of these torulæ, which act as ferments, and effect the splitting up of complex bodies, such as sugars, into various products, but do so in varying degrees. Saccharomyces cerevisiæ is the common beer yeast which promotes fermentation in beers. Saccharomyces-vini produces fermentation in wine ; it is plentiful in the air.

Saccharomyces pastorianus is also found in wines.

Saccharomyces mycoderma abounds in the scum of wine, beer, and fermented cabbage.

Mycoderma aceti, a bacterium, and the active cause of fermentation of beer or wine, is of course quite distinct from this fungus, which has nothing whatever to say to alcoholic fermentation. However, saccharomyces mycoderma has a very great and distinct interest for us, and in the following way. Every one knows that children, and debilitated persons, have their mouths rendered sore by thrush, and that this disease is traceable to a fungus—the so-called Oïdium albicans. Now this oïdium albicans is only a peculiar mycelium-like growth of saccharomyces mycoderma, in fact, its environment induces an elongation of the cells, which become connected by short, straight, rod-like processes, the whole having the well-known branched seaweed-like appearance.

Among true mycelium-forming fungi, the hypho-mycetes or moulds, we may mention the oidium lactis, a white mycelium-forming fungus, found in the surface of milk, cheese, bread, paste, etc. It consists of elongated oval cells, connected together end to end, and supported upon a branching sort of framework. By some, the mould is considered to be one and the same with the parasite of herpes tonsurans, favus, pityriasis vercsicolor (Gravitz).

Having considered the more common forms of micro-organisms met with in health or disease, we propose to pass on to the more immediate subject of our paper, namely, the study of materials which are capable of combatting the morbific germs. Klein has justly pointed out that very fallacious tests have been proposed in judging of the germicidal powers of antiseptics.

Thus spores of micro-parasites, if placed under conditions in themselves favourable to development, will, should carbolic acid of a strength of 1 per cent. be added, remain quiescent, and appear to be destroyed. Such is not the case, however, as these very spores will grow into active organisms if removed from the carbolic acid. The same observer has placed spores of the bacillus anthracis in a solution of perchloride of mercury of a strength of 1 in 300,000 and found they failed to germinate. When removed from the mercurial solution, they at once developed into bacilli, and evinced the utmost activity.

II.

Carbolic acid and the carbolates.

The impure or crude acid is obtained by distilling coal tar at from 300 deg. to 400 deg. F. The distillate is mixed with concentrated solution of potash, and subsequently with water. It is then necessary to add hydrochloric acid to separate the acid from this alkaline solution. To convert this impure into pure carbolic acid, a very complex process has to be resorted to, and one which it is hardly necessary to specify here. When purified, the acid appears in minute transparent plates or long rhomboidal needles ; it is highly deliquescent, inflammable, and neutral to test paper. Carbolic acid is soluble in water, to the extent of 1 in 20, freely so in ether, alcohol, acetic acid, glycerine, also in the volatile and fixed oils. Under the action of nitric acid, it becomes converted into a canary-yellow body—picric acid.

Carbolic acid evinces a very decided physiological effect on batrachians and mammals, and is absorbed by cut or rawed surfaces. Locally, strong carbolic acid produces anæsthesia, not only at the immediate seat of application, but also for some little distance beyond, and would seem to be due to local injury to the nerve endings.

Persons vary very much in their susceptibility to the toxic effect of carbolic acid ; whereas some become poisoned when merely exposed to the "carbolic spray," others bear without harm the use of strong solutions day after day, and even several times a day. When toxic doses are taken, muscular weakness, tremors and convulsions follow ; there is great restlessness, lowering of temperature, diminution of general sensibility (Husemann) dyspnœa, insalivation, and inflammation of the superficial structures of the eye. The action of the heart is depressed ; coma at length follows sleepiness, and death results. Of course, many of these symptoms will be absent in any given case, and among mammals, convulsions as a rule follow only upon the ingestion of very large doses. Husemann records blood and albumen being found in the urine in a certain number of cases ; while in most instances, when carbolic acid is employed in anything like large doses —doses which may give rise to no other untoward symptoms —the urine becomes coloured of a dark brown red hue. A pine-chip dropped in this carbolised urine, and then immersed in hydrochloric acid, assumes a green colour, thus affording a useful test of the presence of the acid. Carbolic acid, mixed with ten per cent. water, was made officinal in the British pharmacopœia of 1885.

Alkalies, albumen, glycerine, olive oil, are stated to possess more or less antidotal power, and Kunde commends saccharate of lime. The solution sulphates may also be used if other antidotes are not at hand.

Carbolic acid acts as a poison upon protoplasm, and to this property it owes its reputation as a disinfectant and germicide.

Koch, making a series of very elaborate experiments, arrived at the following results. He placed spores of anthrax, chosen on account of their ready adaptability in solutions of varying strength.

After exposure in 2 per cent. for three days, the spores developed actively on being placed in cultivation fluids, that is, in a material in which it is ascertained that these bacilli spores will develope.

When placed in a 2 per cent. solution for five days, spore development was rendered less active, but not stopped.

The spores being placed in a 5 per cent. solution, were destroyed after immersion for twenty-four hours in one case, and after forty-eight hours in the second.

A 5 per cent. aqueous solution destroyed after immersion for seven days. Koch maintains that for practical purposes a disinfectant requires much longer than twenty-four hours for its prophylactic action, since it loses power by volatilisation. When tested with developed bacilli, it was found that a 1 per cent. aqueous solution of carbolic acid destroyed the bacillus in few minutes, but of course such a strength solution would be absolutely inoperative against resting spores. It was also sought to determine what power carbolic acid possesses of checking the growth of bacteria. Careful experiments showed that one part of pure carbolic acid in eight hundred and fifty of a cultivation fluid (see above) prevented growth completely, but that one part in twelve hundred and fifty produced diminution of activity of development. However, many aerial organisms, such as would be liable to infect the buccal cavity, were found able to develope freely in such solutions ; indeed, Jalan de la Croix found that it needed a strength of one in four hundred parts of cultivation fluid, to check development of aërial microparasites. We are bound, then, to regard aqueous solutions of carbolic acid in any strength less than 5 per cent. as being unreliable, and further, it must be admitted that even a solution of this strength needs considerable time to exert its action, and before it can be a true and thorough germicide. Of the carbolates it must be allowed that their disinfectant properties are of less value than carbolic acid itself. The sodium carbolate failed to destroy spores, although it checked their development after their immersion in it for ten days. The sulpho-carbolate of soda failed, although the spores were immersed for a long while. Crude wood spirit and crude pyrolyneous acid required respectively twenty and two days' immersion before spores were destroyed. Of the carbolic acid compounds the most reliable as a disinfectant is undoubtedly the zinc sulpho-carbolate, but even this required five days' immersion before the spores were destroyed. Koch further tested carbolic acid dissolved in olive oil, and states, that spores remain absolutely unaffected when allowed to lie in this material for upwards of three months ; indeed, he finds olive oil is in itself as potent a disinfectant as carbolic oi

(5 per cent). Watson Cheynes, whose wide experience of antiseptic surgery gives him an authority to speak on this point, says, that carbolic oil is much more satisfactory than would be supposed from Dr. Koch's experiments.* Carbolic acid in alcoholic solution seems as feebly active even as carbolic oil, so that when carbolic acid is to be employed at all, a 5 per cent. solution in water should be selected as the only reliable preparation.

British Journal of Dental Science.

LONDON, OCTOBER 1, 1886.

PROFESSOR JOHN MARSHALL ON THE COLLEGE OF SURGEONS AND THE DENTAL PROFESSION.

Among surgeons, few men have won more universal respect and confidence than John Marshall, F.R.S., Surgeon to the University College Hospital, and late Lecturer on Surgery to that school. For width of judgment, for tenacity of purpose, and uprightness, this eminent surgeon holds a reputation which ranks him as one of the intellectual *illuminati* of this generation of English surgeons.

So great a power as Professor Marshall unquestionably is in Lincoln's Inn Fields, having but recently passed through that highest of surgical distinctions—the Presidency of the Royal College of Surgeons—must carry weight when he takes upon him to expound the dark places of that sometimes inscrutable body, the Council of the Royal College of Surgeons. Mr. Marshall, in the course of a truly pithy speech, delivered after the dinner held to celebrate the meeting in London of the British Dental Association, dwelt at first upon the foundation of the L.D.S. by the College of Surgeons of England; pointing out how largely that measure was brought about by Sir William Lawrence, Joseph Henry Green, and more especially of John Moncreiff Arnott.

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* Micro-parasites in Disease. 1885.

All who are familiar with the as yet unwritten history of dental surgery during the past few decades will recognise how justly to Moncreiff Arnott was given the honour of having taken up what appeared in those days a hopeless, even if deserving, cause, and of having breasted for a time single-handed the tide of bitter opposition and high-handed disdain. All these things are now happily changed, and it were well that we should not forget those who, helping us in our need, did much to effect the happier state of things we now enjoy.

Professor Marshall, however, did not content himself with mere retrospect. Probing the future, he hinted at a probable severance of the dental faculty from the surgical, and lightly sketched in what must precede such a dissolution of connection between the two bodies. And we are fully at one with Mr. Marshall when he speaks of the necessity of the establishment of a corporation composed solely of surgeon-dentists, with a dental council, and a dental charter which would invest such a corporation with the power of granting diplomas. It must, we opine, come to this sooner or later : this or some scheme which, while differing, perhaps, in conception, will yet achieve the same results.

Granting all the meed of gratitude which is undoubtedly owing to the College of Surgeons, we must feel that the Licentiates in Dental Surgery are regarded rather as a graft, which, although deriving its sap from the parent stem, has yet never really grown at one with its host. Save those among us who have taken diplomas in surgery, we are unrepresented in the College Councils, and receive but little protection from the College against the wrong-doings of those holding the College diplomas.

One ought not, perhaps, to expect too much, but we are not asking very much when we say that the only portal which exists in England, whereby dentists can obtain a license to practise their profession, should be in harmony with the wishes and traditions of a profession which has made the rapid strides which characterise dentistry during the last few years.

Among the controlling spirits there should be those who understand what is needed for the advance and reform of dentistry in its political aspect, and who have its welfare at heart. For the recent election of Mr. Septimus Sibley to the councils of Lincoln's Inn Fields, dentists may be pleased, as he, at least, has been brought into close association with the leaders of our profession. But, surely, it were not a very vast concession for the College to make were it to promote to its Council chamber one of the many earnest spirits among us, who could speak with authority, and bring forward and advise upon matters closely related to dentistry.

Many appear to think that it is more a matter of importance to attend to internal reform, and, by concentration and centralisation, the well-being of the profession will be better advanced than by attacks which they deem Quixotic upon the fastnesses of the governing body of the College of Surgeons. Any change in the organisation of that College would, they say, need a new Charter, and such a matter might be as easy to obtain for a corporation of dentists as for the older foundation. And there is much to be said for this view of the case. At present, L.D.S. have no voice whatever in the election of councilmen, and the number of Fellows of the College is too small to make their voice heard, so that help must come through the surgeons. We are aware that there are many who, like Mr. Marshall, Mr. Erichsen, and Mr. Christopher Heath—all, more or less, closely associated with dental hospitals, and who, it may be presumed, will interest themselves in promoting reform in the direction of obtaining for dentists some representation in the councils of the College of Surgeons. Surely, a profession which can boast of a man like Sir John Tomes, whose scientific acumen and sterling qualities enforce the higher encomiums for all branches of the profession alike, would find little difficulty in selecting a candidate well able to sit at the Councils of the College of Surgeons, and who would be sure to promote alike the interests of dentists and surgeons.

THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.—There will be the annual prize distribution, in connection with this Society, on the 6th of October next, at eight in the evening. Sir Henry W. Acland, K.C.B., M.D., F.R.S., Regius Professor of Medicine at Oxford, and President of the General Medical Council, will give the Inaugural Sessional Address. The prizes will be distributed by the President of the Society.

VALUABLE OBTUNDER FOR SENSITIVE DENTINE.—Dr. Herbst is quoted by *Items of Interest* as using the following: namely, sulphuric acid 1 dram, crystals cocaine 30 grains, which makes a saturated solution, to which is added all the sulphuric ether it will take up, any superfluity of the latter being allowed to evaporate. Prof. Taft spoke favourably of this obtundent, in his experience. The sulphuric acid decomposes a portion of the calcareous elements of the dentine, leaving a deposit of sulphate of lime in the cavity. The cocaine and sulphuric ether neutralise the pain caused by the acid.

THE title of doctor—says the *Independent Practitioner*—was invented in the twelfth century, at the first establishment of the Universities. William Gordeina was the first person upon whom the title of Doctor of Medicine was bestowed. He received it from the college at Asti, in 1329.

HYPERIDROSIS OF THE HANDS.—Excessive sweating of the hands is a source of much trouble, especially to dentists, whose hands should, above all things, be clean, pleasant to behold, and free from even the slightest ill odour. There are many applications useful in checking this condition; salycilic acid, oxide of zinc of a mixture of the two with acacia powder proves useful. Sometimes boracic acid in saturated aqueous solution answers very well.

NEGRO DENTISTS.—It is stated that a school of Dentistry is to be opened in the Meharry Medical College, Nashville, Tenn., in which negroes will be trained for dentists.

American Dentists Abroad.—The Prussian Minister of the Interior and Medical Affairs has issued an instruction preventing dentists who have graduated in America from practising as "royally licensed" dentists. They can only procure a "trader's license," and are prohibited from opening dispensaries ; also from lecturing and teaching dental surgery; can, however, give clinical instruction.

The Editor of the *Southern Dental Journal* adds: European Governments are generally strict in their requirements for a medical education. Imposition has been practised so often, that they have called a halt. The United States once led the world in dental education, and all Europe came here to be educated, just as medical students sought and do yet seek European schools for thoroughness. Things are changging. Only a few foreign students, compared to a few years back, seek our shores. What is the reason? It does not require a Philadelphia lawyer to answer.

A New Mode of Taking an Articulating Impression.—Mr. Stewart Spence, writing in *Cosmos*, says : In taking articulating impressions, desirable results may be obtained by the use of two sheets of mica ("isinglass") placed together in the lump of warm wax to be used for taking the "bite." Each sheet is laid on a flat surface, and warm wax pressed upon it, and then brought together, the overlapping edges of wax being pressed together so as to hold the two pieces as one until the whole is in the mouth. But, first, a slip of wood is pushed into the wax from the front and just a little aside from the median line, the sheets of mica having had V-shaped spaces cut in them to permit the stick to penetrate the wax sufficiently to act as a handle, and at the same time to prevent the jaws from closing any more than is desirable. In many cases the width of the bite may be determined by the size of this stick, previously whittled to the width desired. The mass is now placed in the mouth, and the first closure made. The operator will then insert his finger, and, in pressing the wax down against the teeth, also sever the slight connection of the edges of the wax, and then the mouth may open and shut freely, indicating by repeated closures what is the correct relative position of the jaws during occlusion. But should the divided halves not separate freely, a thin spatula may be run between them. Before withdrawing the bite from the mouth, the halves may be fastened together by running a hot instrument into the space left in the wax by the stick of wood. If an excess of wax is used, so as to necessitate the cutting away of some of it to allow the lip to fall into its proper position, one or both halves may be easily removed from the mouth and replaced.

CURIOUS EFFECT OF A SMALL DOSE OF ETHER.—A contemporary cites the following curious instance of idiosyncrasy to ether : Mrs. W., forty-five years of age, housewife, fell down-stairs, striking her face against the railing, from which she sustained quite a severe contusion of the right cheek, with effusion of blood under the conjunctiva, from the outer canthus to the margin of the cornea. When first seen she was suffering from a slight frontal headache, for the relief of which the writer applied to the forehead not more than six or eight drops of sulphuric ether with a camel's hair brush. The patient at once said, " That is ether, and it is putting me to sleep ; " and, in less than half a minute, she was under the influence of the anæsthetic, remaining unconscious for several minutes, and, upon recovery, and for some time afterwards, presented all the symptoms following profound and prolonged etherisation. She could not have inhaled more than three to five drops of the ether, as it was immediately washed from her forehead.

EUGENOL.—A correspondent of the *Dental Cosmos* says : Eugenol is of great value used as a disinfectant, antiseptic, deodoriser, and obtundent. It is a superior agent in all these particulars, and is free from the objectionable characteristics usually belonging to the class. Though sharp to the taste, it is not especially disagreeable. It is not caustic, like carbolic acid and creasote. It is not destructive to the tissues, and there is nothing to fear from a little excess in using. It can be employed without extra caution for thorough saturation of infected dentine, or passed freely to the extreme points of the root-canals. While it thoroughly disinfects, it does not cauterise. It does not coagulate the albuminoid surface, leaving material for putrefaction beyond in pulp-canal and dentinal tubules, as carbolic acid does, but penetrates, saturates, mummifies, and *stays*. A root-canal in which it has remained a day and a night is safe to fill, though previously septic. Eugenol represents the strength of the essential oil of cloves. Whether its virtue comes from additional oxygen, or mere exclusion of non-essential elements, is uncertain. It is of great value in the treatment of pulpless teeth. As a pain obtundent, by application to super-sensitive dentine, eugenol has the virtues multiplied of the time-honoured oil of cloves. This, with its disinfectant qualities and general innocence, gives it a value above any agent with which I am acquainted, for use in teeth containing living pulps.

ACCIDENT FROM EXPLOSION OF A VULCANISER.—According to the *Philadelphia Times*: "Mrs. Weakley went to Seger's dental rooms to have something done to one of her teeth. She was hardly seated in the dentist's chair, when there came a terrific explosion, which badly bruised the patient, and ruined her clothing, frightened the dentist nearly out of his wits, and made a wreck out of the room. When the doctor and his patient had recovered from the shock it was discovered that a machine in the room, called a vulcaniser, had exploded. The report was like the bursting of a cannon, and the havoc nearly as great." It is said that the vulcaniser was not far from the patient and operator, and that the room, after the explosion, presented a most dilapidated appearance. The panels of a door were driven completely out, and, in another, an articulator, with a cast of a set of teeth, was indented so deep that it stuck fast. A window-sill was torn up, and pieces of the exploded machine were found in walls and ceiling. The escape of the dentist and his patient was miracuous. A suit for damages is threatened by the lady.

Abstracts of British & Foreign Journals.

INDEPENDENT PRACTITIONER.

LOCULOSIS ALVEOLARIS (POCKET DISEASE OF THE ALVEOLUS).*

FOUR STAGES.

By J. N. Farrar, M.D., D.D.S., New York City.

General Remarks.—This paper deals with the treatment of loculosis.

The writer asserts that the rise and progress of this disease, which, *once established, is never cured by unaided nature, except by ejection of the tooth,* may be divided into four stages. 1st. Gingivitis. 2nd. Separation of the lining membrane of the socket from the root, constituting the pocket. 3rd. Caries. 4th. Necrosis of the alveolus.

He is convinced that this disease is the combined result of systematic tendencies and local excitants. Dealing with the latter, he observes:—

The direct cause of exostosis is generally irritation of the coverings of the root, through some violent action of the tooth, as from the habit of biting threads ; while on the other hand, the causes of loculosis, local, as well as systemic, lie outside of the tooth, starting from the peculiar condition of the system which may be said to impregnate the circulatory and oral juices with earthy matter to such a degree, that the immediate environments of the tooth—such as decomposed food and altered secretions, resulting from perverted functional conditions of the tissues immediately in contact—cause a chemical precipitate upon the tooth of the calcareous matter that floats in these circulatory and oral juices, to which state of things the naturally susceptible constitution of the alveolar ridge, which is one of the most easily affected parts of the body, is a powerful assistant.

Considering the local effects, he reminds us there is no union of the gingival margins of the gum with the enamel ; therefore, as the gum generally extends above the point of its attachment, slightly overlapping the enamel, and forming a shallow trough around the neck of the tooth, although closed by contact while healthy, it will be seen great harm is liable to ensue should irritating matter get into it.

Gingivitis, 1st stage.—The first characteristic of the true forerunner of loculosis is a peculiar redness of the margin of the gum. The lip has not a surface rawness, such as when collections of "salivary calculus" exist upon the *crowns* of the teeth; the lip still retains its epithelium, which condition is indicated by a deeper red, bordering upon blue. This becomes chronic, and gradually changes to a lighter translucent shade.

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* A lecture delivered before the Brooklyn Dental Society.

This ring becomes more and more pronounced in outline, until it passes the line of mere inflammation and becomes incipient loculitis.

Careful examination within the annular trough detects a small quantity of decomposed food mixed with rancid serumal juices, some rough calcareous matter is often fixed upon the root. At this earlier stage it is a mixture of two varieties of deposits, both from the blood; one directly, having oozed through the soft tissues constituting the walls of the trough (serumal deposits), the other by a roundabout way through the salivary and oral glands (salivary deposit).

As the disease extends down the root, the serumal deposit increases. These accretions are irritating, one acting like a rancid poultice, the other like coarse dried sand paint. The irritation aggravates and increases the congestion, causing the lip in effect to pouch out from tbe lingual and buccal surfaces, the disease extending down between; the tissues bleed from slight cause.

The most pronounced cases of congestion are found among young women at their menstrual periods. They are easily cured by two or three treatments, and it is not liable to recur, or to end in loculosis.

This swelled condition of the annular lip increases the capacity for deposit, which accumulates as fast as room is made. In this way increased irritation and enlargement of the trough increase.

The chafing of the soft tissues against the roughness within causes an increased osmotic flow of the juices through the walls into the trough; these decompose, leading to formation of small quantities of pus.

This stage of the disease is easily cured by thorough cleansing, followed by injection of some germicide lotion.

It is, however, pointed out that loculosis, when once established, even if cured, it is liable to recur from slight cause, for while the removal of the exciting cause may cure the local disease, it does not do away with the causes which underlie the local excitants.

2nd Stage.—This irritating deposit being allowed to remain, the quantity will increase. The lining membrane along the line of its union with the root becomes so weak that it finally falls away, owing to the increased congestion.

In this way the pocket becomes formed, the hard tissues underneath then become affected, and waste by retrogessive metamorphosis, urged on by deeper inflammation, so that the gum margins recede.

Epithelium sheds around the tooth, exposing a raw surface of the gum, wasting of the gingival margin of the gum, or even the presence of this raw circular tract, although strong evidence of loculosis, is not always a proof of it, for both may result from the presence of large quantities of rough calcareous accretions upon the crowns projecting over the gums, where all manner of inhabited filth may collect.

Hence he considers it is shown that the principal secondary cause of the separation of the socket membrane from the tooth, seems to be congestion of the blood tracts caused by foreign substances wedging along, so to speak, between the socket membrane and the root of the tooth, as fast as the separation takes place.

Although generally confined to narrow limits and to one or two places on one side of the tooth, the disease occasionally attacks several points, often more or less circumscribing the root in one direction or the other, or both, sometimes cutting off the nutrient supplies to the dental pulp, and occasionally of the septums between the sockets to such an extent as to involve the adjacent socket membrane.

At this stage, or a little earlier, disagreeable sensations about the teeth, even to pain, may occur ; but pain is not always proof of any special stage. While most people begin to experience uneasiness at this stage, others are so sensitive that they feel something wrong much earlier. Some people have no pain or discomfort, even if their teeth are loaded with calculi and stand in inflamed pockets of pus.

The alveolar process behind the soft tissues continues its retrogressive changes and becomes absorbed. This increases the diameter and reduces the depth of the socket. Sometimes entire septums between the sockets are in this way destroyed. The alveolar process, macerated and dried while in this condition, would appear soft and porous like that portion of the alveolar process around a large abscess. This perverted condition may be carious, but not necessarily necrotic.

The disease seldom advances beyond this point, except perhaps in the degree of waste of the tissues, which generally goes on undermining the tooth until it falls out ; after which the socket wall becomes covered with new granulations, perfecting into tissue, and the local disease rapidly disappears.

In a majority of cases the disease can be cured by careful cleansing of the parts, and injecting some such germicide drug as diluted non-escharotic creosote, and letting the medicine overflow into the mouth sufficiently to destroy all of the oral microbes ; yet the exposed portions of some of the roots are so degenerated and softened, even upon living teeth, that cure is impossible unless it is scraped away.

It may be thought that unless the pocket is closed by reunion of the soft tissues with the root, the disease cannot be said to be cured ; this is erroneous. The pocket is the result of the disease, but the pocket is not the disease itself. The union of the soft and hard tissues is desirable, and is frequently attained in practice ; but its failure does not prove the disease remains unchecked.

3rd (*Carious*) *stage*.—In proportion as the disease becomes violent, it interferes with the nutrient supplies, tissues involved, and also to the adjacent tissues, whether hard or soft, causing a fall in tone of vitality ; sometimes this influence is so great, that the hard tissues take on a character analogous to mortification of the soft tissues. At this time, and occasionally during the stage immediately preceding, particles of calcific matter become detached and work themselves through the gums, causing, in appearance, a sort of gumboil (not alveolar abscess). In the second stage the case, unless too far advanced in disease, is generally curable without excision of the hard tissues. The treatment is plenty of nutritious food, thorough cleansing of the pockets, followed by some stimulating non-escharotic, antiseptic germicide. If the hard tissues have degenerated beyond resolution, excision becomes necessary.

4th (*Necrotic*) *stage*.—Increased quantity of pus, added to the carious condition of the hard tissues behind the pericemental wall of the pocket, accompanied by still greater congestion, so impairs the vitality of the parts that the circulation is stagnant, and some portions of the sick tissues die. Separation between the soft and hard tissues in some places now begins, often followed by ulcerative destruction and waste of the superincumbent soft parts, until the tissues are so soft that they can be pierced by the probe without causing much pain.

Under such circumstances, the pockets filled with pus, rancid juices, decomposed food, microbes, and sharp, irritating, earthy deposits projecting from the root, congestion, stagnation, and disease all about, with little or no nutrient supplies, caries end in necrosis, often followed by waste of the coverings, until finally the dead bone is exposed.

As the condition preceding death of the bone is more apt to interfere with the nutrient supplies of the septums and edges of the sockets than elsewhere, necrosis is shown there first ; from the edges of the socket death extends downward, but generally, more rapidly in the septums.

Pus from necrosed tissue is often ichorous, and this, mingled with the juices in the pockets, if allowed to accumulate, aggravates, and the tumefaction takes on the appearance of abscess, which may prevent sleep. Besides tumefaction of the soft tissues, the bony portions of the sockets often waste away, so that after the deposits are removed, there is left a space of one-eighth of an inch.

Necrosis does not often occur in loculosis alveolaris, but when it does, the treatment is excision of the dead tissues, and the occasional use of sulphate of zinc (gr. xxx. to ℥ ÷).

Literary Notices & Selections.

FILLING TEETH AND FILLING-MATERIALS.*

By Alton Howard Thompson, D.D.S., Topeka, Kansas.

It is a wholesome indication of the progress of the times, that papers and discussions in our societies are taking the turn of dealing with the practical and simple things of every-day practice. The scientific wave which has swept over the profession of late years, is about to be succeeded by a practical wave—an application, as it were, of the science in practice. These waves of theory and practice alternate, and rise and fall with a more or less regular cadence, and a mutual compensation, due to reaction upon each other. And so, as a contribution to the practical wave now bursting upon us, the practical subject of filling teeth and filling-materials has been selected for this paper. These are of the simple things which do not receive the attention their importance warrants. They are of the ordinary things, which are so commonplace that we give them little or no thought, while we perform them in a sort of automatic way after a conventional manner. But the operation of filling teeth, which occupies the most of our working hours, is so very important, both to ourselves and to those whom we serve, that we cannot dwell upon and discuss its details too much—if, by so doing, we may receive or give anything that shall enable us to do better, and save more teeth.

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* Read before the Nebraska State Dental Society, at Beatrice, Neb. May 19, 1886.

To begin with, the operation of filling teeth may be defined as one which consists of removing the decomposed tooth-substance from a cavity of decay, and the filling of that cavity with some material which shall effectually prevent recurrence of the disease at the same place. Many details and variations enter into the process, as cavities differ. Of course, all simple cavities can be classified roughly, and one kind of operation will answer for all of one class ; but, unless these are strictly simple, the least complication takes them beyond the rule of thumb, and each cavity becomes a law unto itself, and must be treated by itself. In view of this, the capable dentist must be something more than the mere automaton, which could perfectly plug the uniform holes in pieces of ivory just as they came. But, as the holes in teeth present infinite variety, they must be dealt with with intelligent judgment at every step in the process of treating and filling.

The first step in proceeding to fill a cavity of decay in a tooth is to obtain access to that cavity to permit of free working. In the anterior teeth, where the cavity is upon the approximal surface, the first thing is wedging, to separate the teeth. The palatal wall is then chiseled down, to admit the burs and excavators. In the approximal cavities in the posterior teeth wedging is not always admissible, but the file and disk will usually be required to make space at once. Access for the instruments will be obtained by cutting down the grinding wall, then burring this opening into a dovetail with fissure-burs. Sometimes, though rarely, it is better to enter approximal cavities from the buccal side ; but good work cannot usually be done unless they are well exposed by being located toward that side. Cavities upon the masticating surfaces of the bicuspids and molars are opened first with the chisel along the fissures and through the weak walls, followed by the fissure-bur. Cavities in other positions on the teeth must be cut down at the edges to the solid walls, unless cement is to be used, when weak portions may be left, which it will support.

The next step is cleaning the cavity of carious matter with excavators and burs. It is well to remove the most of the carious matter before adjusting the rubber dam, that the patient may be required to endure the latter discomfort as brief a time as possible. The rubber dam is then applied, first punching holes for those teeth only which are to be exposed. It is slipped between teeth which are very close with waxed floss silk. Where there is danger of its slipping off, a bead tied in the ligature will help to hold it on, and this can be reinforced with cotton and sandarac. This is also a good expedient for accidental puncture. Where there is great difficulty in keeping the rubber dam on the back teeth the clamp is allowable ; but for ordinary places it is an inexcusable barbarism.

Having adjusted the dam, and removed all the visible carious substance from the margins of the cavity, it should be bathed with carbolic acid, which, in addition to its antiseptic uses, will usually bring out the soft places by rendering them darker. But, as this test cannot be relied on to reveal all the defects, it will be necessary to go over the margins well with a fine, keen excavator, feeling for the chalky places, which should be well burred out. The solid carious dentine is to be left in the direction of the pulp, after having been well sterilised. If the pulp is nearly exposed, it should be covered with a piece of soft, porous paper, wet with carbolic acid, and over this thin phosphate cement is flowed. All cavities of depth should be filled with cement, and, after hardening, sufficient cut away to insert the durable filling proper. Where the pulp is approached, this cement will protect it from thermal changes and the force of filling. Where the wall is frail—as in the anterior walls of approximal cavities in the incisors, or the buccal walls in bicuspids and molars—the cement will support and give such walls strength, and preserve the tooth-substance where exposed to view. When cavities on the grinding surface of bicuspids and molars are deep, and the walls frail and shelving, it will protect and support them. Indeed, the uses of cements in deep portions of cavities are numerous, but judicious selection must be exercised, for the thinness of the walls and the quality of the teeth must be considered at all times.

The next step will be the preparation of the cavity for the retention of the filling. In the anterior teeth, approximal cavities will require a slight groove at the cervical border, which should be deepened at the ends into a sort of pit.

This pit should not be a tap drilled into the tooth-substance for a quarter of an inch, to chip the enamel and weaken the walls, but a depression a little deeper than the groove, just sufficient to secure the first portions of gold, and prevent rocking. As the caries will have made a groove along the labial wall, none will usually need to be cut there ; but one must be made along the palatal wall toward the centre of the tooth, and a pit-like depression toward the corner of the tooth-edge, thus completing the opposing retaining-points. Great care will be required in cutting toward the corner, that the enamel be not checked or weakened. If it is weak, or becomes cracked, it had better come off at once ; for it will surely do so after the filling has been in use, and lead to its ruin. The corners break away sometimes when we consider them strong, and we must take no risks that we are aware of. A weak labial wall, supported by cement, is safer than a weak corner. Approximal cavities in the posterior teeth will need to be grooved from the grinding face opening, with as little undercut toward the sides as possible, although caries will often make this undercut. In other positions, the shape made by the disease will usually leave the cavity well formed to retain the filling ; but where the edges are shallow, pits or grooves must be made that will oppose each other. Regard must always be had to the opposition of retaining-points, that the filling may be secure against the lifting of expansion, or the capillary effects of the fluids within and without the tooth. The forces which act upon a filling to cause its expulsion are so strong that all the security possible must be given to the filling. The edges of the cavity should be bevelled and polished as well.

The next step is the introduction of the filling. Beginning with gold, the first layers are employed unannealed, and are pressed well into the cervical grooves of approximal cavities, or the posterior points of other cavities, and condensed with small points with little force by a heavy mallet. Foil is then annealed, attached, and condensed in thin layers, well worked over. Small cylinders, or pieces torn from larger ones, are then condensed in the same way, to build up the bulk of the filling ; the margins being carried up with the semi-cohesive foil. Large cylinders are condensed on the outer surface with larger points to give a finishing surface, as the small points might make the filling pitted. But in no part of the process of condensation is *much* force used. Gold is too often introduced in such large pieces that great force is required to condense it, and with a doubt as to this being thoroughly packed, or the pieces being well welded. After-flaking of the gold is a result of using large pieces and imperfect malleting. The safe plan is to work it on in small pieces with small points and light blows. The tooth is spared the jar and strain, cracking of the enamel is avoided from the forced expansion of the filling, and in working, the touch is a complete guide as to condensation.

After the filling is introduced, it should be well burnished with strips, tapes, disks, stones, and polishing-powders. The gold should be frequently burnished during the process of finishing, to eradicate all irregularities, and a fine burnish should be left upon it at the last, that food may not lodge upon it. But in exposed places this burnished surface should be frosted with pumice, to give a dead, unreflecting surface. The platinum and gold combination makes a harder surface than gold alone, and should be used upon the edges of incisors and the cusps of cuspids and bicuspids—*i.e.*, for all "shoeing" of the worn ends of teeth. It promised well at first, as furnishing a grey finish for exposed surfaces of fillings; but patients object to having "tin teeth," as they call them, so that they will rarely consent to its use in visible locations, preferring the pure gold.

In approximal cavities of the bicuspids and molars it has been the writer's custom, for a number of years, to line the cervical margins with a good layer of tin foil. This is accomplished by flattening a tin cylinder of the proper size, and cutting a proper length off from it, which is condensed flat against the cervical border. A long experience with this method has demonstrated that it is good practice. The therapeutical qualities of tin, its oxidation and hardening of the dentos at that place, and its combination with the gold, makes the filling more durable at the most vulnerable point of approximal fillings—the cervical edge. It makes a better joint than soft gold, is, besides, a better preserver of tooth-substance, and experience has abundantly testified to the value of this expedient.

For filling with amalgam, the cavity need not be so strongly shaped, nor be made so directly accessible, and the overhangs need not be cut away as much. But there is much to be learned yet to make good edges; for, although amalgam fillings last well, the edges do not remain sightly, and will finally leak. The filling should be polished well after it hardens—the next day, or as soon thereafter as possible—for many failures with this material are due to the neglect of this rule. Protrusions of the filling at the cervical border, as waste pieces floating back and becoming attached to the filling, make irritating points, which cause inflammation of the gum-margin, or catch and retain food and débris, the decomposition of which leads to recurrence of the disease about the filling. Besides, the filling cannot be finished nor polished until it has become hardened, and no good workman will let his work go unfinished.

The question of precise discrimination in the use of filling-materials, is one that does not now agitate the professional mind as it did in the days of the "New Departure" controversy. In the selection of the proper materials, that faculty called judgment must be called into active employment in almost every case. There are very few cavities that can be prepared and filled by rule, for almost every one makes a demand upon the intelligent judgment of the operator. Sir Joshua Reynolds said well, in regard to painting, that "genius begins where rules end," and this truism might be applied with equal force to dental operations. It is the genius of discrimination that makes the successful dentist, for, beyond all men, he cannot work by the rule of thumb.

Gold should be employed in all teeth which will bear it. That is the simple rule. But in practice, in the application of the rule, there will be found all kinds of difficulties in the way of proper discrimination between the teeth which should and those which should *not* be filled with gold. But, year by year, the noble metal is gaining on the plastic materials; for, by means of improved preparations of gold, improved instruments, and better methods, we are enabled to fill and preserve teeth which could only be saved by the plastics, even as late as the days of the "New Departure." At that time, cohesive gold was used almost exclusively and indiscriminately by all gold operators, with the result that they had very many failures; and it was these failures that gave the "New Departure" movement its being and its phenomenal activity. We have, however, learned many things even since that time in relation to gold, to methods, to instruments, and as to the filling qualities of teeth. We discriminate very closely now, and without prejudice, for or against any *ism* or *pathy*, and the line is being constantly tightened. In the first place, we have learned that all teeth should be filled with gold which have sufficient density of structure to allow of proper contact at the margins, and perfect condensation of the gold;

and there are very few teeth which will not permit this. Where walls are weak, a supporting lining of cement will strengthen them sufficiently to allow of careful condensation with small points and light blows. The increasing use of soft gold is giving us new victories over the plastics, and extending the encroachment on their domain. Unannealed gold should be used against all margins, as it gives better contact than the cohesive gold or annealed. The expedient of lining the cervical wall with tin is also assisting the usefulness of the noble metal.

Gold is, and will remain the king of filling-materials, and the practitioner of the most mediocre ability is using it more and more. As he learns to preserve more of the teeth with the plastics which he formerly extracted, so now he is also ambitious to extend his knowledge of gold filling, and increase his practice of it. When the most ordinary dentist is ambitious to do fine work, and that ambition is fixed habit, he is a saved man. By persistent study and the practice of better methods, he will soon be lifted above mediocrity, and his further progress is then assured. Just as sure as that he is desirous of progressing, will he develop and improve. No man is so poor a workman, or so unpractised a student, or so illiterate, but that, with a sincere desire to improve himself, he may attain a degree of ability that will be a pride to himself and friends; and in the use of gold for filling, no man is so unfortunate in early training but that, by proper study and application, he may attain a respectable ability.

Amalgam may be employed where gold cannot, for various reasons, be used for filling, and will serve a good purpose as a preserver of carious teeth. In cavities which have hopelessly soft margins—as often occurs on the buccal faces of wisdom-teeth—it makes a better filling than gold. In large approximal cavities in the molars or on the grinding face, when the entire tooth is soft and weak, and the only alternative is extraction, it can be employed to preserve such teeth for years. But the use of the gold shell crown, nowadays, is rescuing such teeth from amalgam in the practice of the best dentists. These places are about all that are left to amalgam now, for gold is crowding it to the wall in almost every direction. Of course, its use in children's teeth must not be forgotten. It is the best for the milk-teeth, and also for the first and second permanent molars until they attain the hardness of maturity, when it can be replaced by gold. Gold is not so serviceable in the soft teeth of childhood and adolescence.

Of course, in ordinary dental practice, there is the irregular use of amalgam where we are compelled to insert it in all sorts of cavities in the posterior teeth on the score of economy to the patient. This is not putting it on its merits, and is, therefore, more or less illegitimate, and is a mere expedient. The patient should be impressed with this fact, that, when used for economy, it is only an expedient; and that just as soon as he can afford it, the amalgam should be removed and gold inserted, and that the operation cannot be considered complete until this is done. It is very nice to talk about filling the teeth of the poor with gold at any rate, for charity's sake; but there are very few of us who can afford this lovely benevolence. In ordinary practice we are still compelled to use amalgam for the sake of economy, for it *is* better to fill with that much-abused material, than not to fill the teeth at all.

Phosphate cement is coming into prominence now as a permanent filling-material, and is so much improved, that it often answers an excellent purpose as a durable filling. It is of especial value in children's teeth, which in the mere babies cannot have any preparation whatever; and at the other extreme of life, in the senile softening and decay of the teeth of the aged, when any protracted operation is equally inadmissible, it serves an excellent purpose and lasts well. In the mere shells of teeth for ordinary adults it also does well, especially in the anterior teeth. The preparation consists in the removal of the carious matter, except over the pulp, which should be protected by the carbolated paper. A *white* cement should then be placed over the inside of the thin walls toward the visible portions of the tooth, for colour; then soft cement run over all the interior, and the filling completed with a proper shade of cement, used stiffer. It is dusted with the powder and covered with a varnish, to exclude the moisture as long as possible, the mouth being held open till it is nearly dry, and the filling trimmed and smoothed at a subsequent sitting. Such fillings, made of the *best* cements, will last for years in most mouths; but there is such a difference in the soluble qualities of the saliva, that it will dissolve away partially in some mouths and require repairing. With a continuance of the present rate of improvement in the cements, however, the next generation will possess such a filling-material as will be sufficiently durable to displace amalgam altogether.

The writer is in the habit of using the cements extensively for temporary fillings for the treatment of sensitive dentine. This method of overcoming the greatest obstacle to filling teeth is better and safer than any other yet discovered. The cavity is cleaned as much as possible, but not prepared, then carbolated, and the cement inserted soft but well. This is left for a month or longer, when the sensitiveness will be found to have subsided sufficiently to permit of comfortable and often painless operating, and the filling can be completed with satisfaction to all concerned. There is also no after tenderness to thermal shock, and the pulp is not endangered by this cause, nor by working when the tooth is in an irritable condition. The probation allows all irritation to subside, and the parts to return to a normal condition. In addition to these and other advantages, the phosphate has the effect of hardening the walls of the cavity, and thus improving the texture of soft teeth, so that they can be filled better with gold. Indeed, soft teeth should always be treated with cement in this way before attempting to fill with gold. As an economical expedient, the cavities in a denture could all be filled with phosphate cement to preserve the teeth from immediate danger, and filled by one or two at intervals, as the patient's means will permit, thus distributing the expense. This is a much preferable method to filling with amalgam for economy's sake, for the amalgam is so durable, that the patient will often not have it replaced with gold when his means will permit.

Dental News.

PROSECUTIONS UNDER DENTISTS' ACT.

Smith v. W. E. Arnemann.

This was a case tried before Magistrates in Nottingham, Aug. 13th ult. Mr. Crawley-Boevey appeared for prosecution, Mr. Whittingham for the defence.

Edward Wilhelm Arnemann was charged with having, on the 5th day of August, unlawfully, at 37, Sherwood Street, used the name or title of a dentist, when he was not registered under the Dentists' Act.

Mr. Crawley-Boevey said :—

The defendant practised for some time at Alfred Street, Radford, carrying on his business as a dentist, having an ordinary dentist's establishment, advertising himself in the local press, and by other ways endeavouring to make a practice. He lately moved from Alfred Street to No. 37, Sherwood Street, where he has taken premises and has his name up on the door plate, or at any rate on the glass panel of the door, with the words, "Dentist, Berlin." Of course the mere addition of "Berlin," the name of a place, does not in any way qualify or affect the statutory meaning attached to the term "dentist" by section 3, which I have read. The mere addition of the word "Berlin" to the title itself, as used by the defendant, does not, of course, relieve him of liability under section 3, because your worship will observe that section provides that no person shall be entitled to use the name dentist in combination with any other word or words, unless he is registered.

But the addition of the word "Berlin" does not relieve him from liability under section 3, because it is seen on reading that section, that the title "dentist" itself implies that the person using it is registered under the Act and specially qualified to practise dentistry. Any person who is not registered under the Act has no right to use that title, and no one can get his name placed on the Register unless he is specially qualified under section 6, which specifies the qualifications necessary for registration. The defence might be contented that the defendant holds some certificate or diploma, granted to him in Berlin, which entitles him to practise there, but I shall submit, even assuming that to be the case, it will not relieve him from liability to the charge which has been preferred against him, because he has not had his name placed upon the Dentists' Register of the United Kingdom as a foreign dentist. Assuming that he has such a certificate or diploma granted by a University in Berlin, he would be able to get himself registered as a foreign dentist, if it is a certificate recognised by the General Medical Council as provided by section 10 of the Act. Section 9 provides for the Registration of foreign dentists with a recognised certificate, and section 10 provides that a certificate which is to be deemed such a recognised certificate as is required for the purposes of this Act, shall be such a certificate, diploma, membership, degree, licence, letters, testimonial or other title, status, or document as may be recognised for the time being by the General Council as entitling the holder thereof to practise dentistry or dental surgery in the country in which it is granted to him, and as furnishing a sufficient guarantee of the possession of the requisite knowledge and skill. On page 24 of the Dentists' Register, a table of registered qualifications under the Act, and among these registered qualifications no reference will be found to any diploma or certificate granted by any college or body at Berlin. Further, on page 226, on which page all foreign dentists registered in this country appear, no mention will be found there of any holder of a certificate granted by any Berlin medical body. So long ago as the 5th of April last, Mr. Canton, the Hon. Secretary of the British Dental Association, wrote a letter to the defendant, calling his attention to the fact that he was infringing the provisions of the Dentists' Act, and warning him that if he did not desist from doing so he would be prosecuted. The defendant merely replied, that he was entitled to use the title "dentist" and intimated that he was prepared to meet any charge that might be preferred against him. The defendant having received notice and his attention having been drawn to the fact that he was committing an infringement of the Act so long ago, it is only reasonable to suppose, that if any qualification he holds was registerable he would have had it registered. From the fact that his name does not appear on the register, and that there is no mention in the table of registered qualifications, or any reference to a diploma or certificate granted in Berlin, it was urged that it might be inferred that he does not hold a certificate entitling him to registration as a foreign dentist. Section 4, of the Dentists' Act formerly provided that prosecutions of this nature could only be undertaken by consent of the General Council. That section has been repealed by section 26 of the Medical Act, 1886, 49 and 50 Vict. ch. 48, and a prosecution may now be instituted by a private person in accordance with its provisions. Section 29 provides that a copy of the Register of Dentists for the time being shall be evidence in all cases, until the contrary be made to appear, that the persons therein specified are registered according to the provisions of the Act, and the absence of the name of any person from such copy shall be evidence, until the contrary be made to appear, that such person is not registered according to the provisions of the Act; provided that in the case of any person whose name does not appear in such copy, a certified copy, under the hand of the Registrar of the General Council of the entry of the name of such person on the Dentists' Register shall be evidence that such person is registered according to the provisions of the Act. In other words, the only way the defendant can meet this objection is by producing a certified copy, under the hand of the Registrar of the General Medical Council, showing that his name has been entered, although it does not appear on this copy of the Register.

There was only one other point which required mention before proceeding to call evidence. That is with reference to the defence that may possibly be raised. Assuming that the defendant does not rely upon a foreign diploma or certificate, the only ground on which he could seek to evade his liability is by relying on the exemptions specified in section 4 of the Dentists' Act. It was pointed out that section 4 provides that with respect to the offence of a person not registered under the Act, taking or assuming any name, title, addition, or description as mentioned in section 3, the following provisions shall have effect, viz., he shall not be guilty of an offence under the Act if he shows that he is not ordinarily resident in the United Kingdom, and that he holds a qualification which entitles him to practise dentistry or dental surgery in a British possession or foreign country, and that he did not represent himself to be registered under the Act. In the first place it is essential that anyone relying upon that section should show not merely one of those three points but all three conjunctively, for the words of the Act are, " not ordinarily resident in the United Kingdom, and that he holds a qualification, and that he did not represent himself to be registered under the Act." With reference to the first part of the clause I should submit, if necessary, that that clause was intended to cover the case of a person coming to this country, not for the purpose of practising, but merely for some temporary purpose, such as attending a medical congress.

Thomas Smith, a clerk in the employ of Bowman and Crawley-Boevey, the prosecutor, went, on the 5th of August, to the defendant's premises in No. 37, Sherwood Street, and received a circular which ran :—

"E. Arnemann, dentist, begs to inform his patients, friends, and the public that he has removed from Alfred Street, Radford, to more central premises, 37, Sherwood Street, (opposite the new police courts, between the university and the theatre), and begs to solicit a continuance of their support. Note the address, E. Arnemann, surgeon-dentist (Berlin) 37, Sherwood Street, Nottingham."

Mr. Canton, the Hon. Secretary of the British Dental Association, wrote to defendant as follows:—" 5th April, 1886.

"Sir,—I beg to call your attention to the fact that the use of the term or designation dentist, either alone or in conjunction with any other word or words, or the use of any description implying that he is a person specially qualified to practise dentistry, by anyone whose name is not on the Dentists' Register, is illegal and punishable. As, however, the Dentists' Act is comparatively of recent origin, and so you may be ignorant of its provisions, or you may possess some qualification which you suppose entitles you to the use of this designation, I shall be glad to hear from you on the subject before bringing your case under the notice of the executive of the British Dental Association.

"I may state that the Association has no desire to deal harshly with any inadvertent infringement of the law, but that the main object of its existence is to carry out spirit of the Dentists' Act, and that it will resolutely proceed against all who persistently infringe its provisions."

His reply of the 8th of April was :—

"Dear Sir,—I am greatly obliged for your kindness to make me attentive of the danger to which I have exposed my person by using the term dentist, though I attach no importance whatever to that appendage. I have made use of it in the good faith that I am entitled to it. I have not acted in whim, but was quite aware what I was about in doing so. I hope you will not delay your rigorous measures any longer, as I am quite prepared to meet you, and wish not to be kept in suspense any longer than is necessary.

"I remain, yours obedient,

"W. E. Arnemann."

Evidence having been taken to prove the offence, place of abode, etc., the defence offered was that, having held his Berlin diploma, the defendant was under the impression he could practise. At the time this Act was passed he was an assistant at Bradford with Mr. James Autcliffe, a registered practitioner. Being ignorant at that time, for he could not speak the English language, he might have been registered as a person in practice at the time of the passing of the Act. He did not avail himself of that privilege. One of the sections of the Act said that a person in practice as a dentist, although he might have little or no qualification, could be registered if he were in practice at the time of the passing of the Act. He had been practising for three years in the town of Nottingham, under the title of "Dentist, Berlin," believing that he might fairly do so because the word

Berlin being added to his designation, could not mislead anyone in the belief that he was a registered dentist under the Act of 1878. You will see by the schedule of persons registered that certain dentists are registered as foreign dentists from various universities. For instance, the last person on page 226, William George Arthur, is registered under the 13th of October, 1884, and what I submit to you is this—that under section 9 of the Act of 1878, this gentleman is perfectly entitled to assume that diploma to be a good diploma, and that he is entitled to be registered by virtue of it.

It was alleged that the prosecution was brought about by gentlemen and persons interested who are registered. The defendant held a diploma, which it was opined would justify him in being registered under that Act. For three years past he practised without molestation in the town of Nottingham. The Act authorising the common informer was passed on the 25th of June this year, *i.e.*, after the letter from Mr. Canton, and it was impossible for the defendant to have knowledge prior to that, that any person might inform, for it was only at the instance of the British Medical Association that any action could have been taken prior to June of this year. If the British Medical Association had taken the matter up, the defendant would have had the advice he has now taken, and would have sought to be registered by the diploma by virtue of which it was submitted he was entitled to be so registered. Although the defendant may have committed an offence within the strict letter of that section, looking at the fact that he has practised for so long, there were many circumstances which absolutely go in mitigation of the offence which he has committed.

Alderman Barber, one of the presiding magistrates, said: There is no doubt the legislature have felt it necessary to protect the public against persons who practise improperly, and without being duly qualified. No doubt for that reason this Act was passed and amended. It is so recently that this amended Act has come into operation that we think we shall be justified in dealing comparatively leniently with this case. The magistrates convict you in this case of this offence, and call upon you to come up for judgment when called upon and to pay the costs.

ODONTOLOGICAL SOCIETY OF VICTORIA.--The ordinary monthly meeting of the Odontological Society of Victoria, was held on Aug. 4th, 1886; Mr. Cumming, President, in the chair. There was a large attendance of members. Messrs. L. A. Carter, D.D.S., and F. E. Holloway were proposed for membership. A sub-committee appointed at last meeting reported that they had sent a letter to each member of the Legislative Assembly, urging them to support the Dental Bill, now before Parliament; and that they had also met a committee of the Pharmaceutical Society, who had expressed themselves satisfied with the provisions of the Bill as affecting chemists. Messrs. Iliffe, Carter and Thomson contributed casual communications. G. Thomson, L.D.S., read a paper on "Fractures," which led to considerable discussion on the mechanical appliances adapted to fractures of the maxillœ.

BRITISH DENTAL ASSOCIATION, CENTRAL COUNTIES BRANCH.—We are requested to state that the Annual Meeting of the Central Counties Branch will be held on Friday, the 8th of October, 1886, in the Board Room of the Dental Hospital, 71, Newhall Street, Birmingham. President: Frank E. Huxley, M.R.C.S. L.D.S. President Elect: Breward Neale, L.D.S. The order of procedure will be as follows:—

Meeting of Council at 1.30 p.m. General Meeting of members, for election of officers, &c., at 2 p.m. Open to visitors at 2.30, when the President will deliver his address, after which the demonstrations will be given, and papers read and discussed as follows:—

Mr. Stephen Burt, L.D.S. Eng., of Leamington, will give a demonstration on "Cylinder Filling," and Mr. John Humphries on "Sponge Gold Filling," which will be followed by a paper by Professor Windle and Mr. John Humphries, L.D.S., Lecturer on Dental Anatomy at Queen's College, Birmingham, on "Man's Lost Incisors," illustrated by numerous models.

Mr. Charles Sims will read a short paper on the First Permanent Molars.”

Mr. Huxley will show a case of excision of the jaw for tumour (with denture).

Mr. Breward Neale will show two patients for whom he has constructed artificial noses, palates, &c. Other cases of interest will be brought forward if time permits.

The Annual Dinner will be held at the Clef Club, Paradise Street, Birmingham, at 6.45 p.m., tickets, 7s. 6d. each.

Practitioners of the district are invited to attend.

BREWARD NEALE, *Hon. Sec.*

MONTHLY STATEMENT of operations performed at the National Dental Hospital, from August 1st to 31st, 1886:—

Number of Patients attended		1,612
Extractions	Children under 14	431
	Adults	692
	Under Nitrous Oxide	510
Gold Stoppings		30
Other Stoppings		318
Advice and Scaling		189
Irregularities of the Teeth		107
Miscellaneous		95
Total		2,372

ISIDORE FRED. PRAGER,

House Surgeon.

British Journal of Dental Science.

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THE PHILOSOPHY OF THE TOOTH-BRUSH—ITS CONSTRUCTION AND PROPER USE.*

By W. G. A. Bonwill, D.D.S.

I am not aware that any one has ever written a dissertation upon this subject. There has been some talk on the hygiene of the mouth, during the past year, but no one has attempted to explain the philosophy of a tooth-brush—how it should be constructed, and its proper use. It is a lamentable fact that but little thought and ingenuity has ever been given to it, although thousands of shapes have been furnished by dentists and others. I must confess to my own shortcomings, up to the year 1876. I had not, up to that date, ever sold brushes, powders, or washes from my office. It looked too much like trading. I always told my patients to go to drug stores and select for themselves.

My attention was arrested, in 1876, by two remarkable cases. Two bachelor brothers had left their dentist on account of not being able to arrest the disease which, he said, was fast cutting their teeth away, both upper and lower. It was noticed that a groove near the cervix on the buccal and labial sides, as far back as the second molars, was being cut. The dentist said it was a disease, and more care must be taken. The brush, with washes and powders, must be applied thrice daily. The apparently specific disease spread, in epidemic form, with both brothers. Filling was resorted to, but with little good results. It was looked upon as an incurable disease, the only remedy being brushing.

When they came to me they were frantic.

In making my diagnosis, I was satisfied, from my previous experience, that the whole trouble arose from the injudicious use of the brush and powders. They spent fifteen minutes after each meal in this work of preservation, as they thought, and once before retiring. They seemed to have nothing to do but think of their teeth, and how they should avert the calamity impending. The filling that had been done was well consolidated, and calculated to have saved from action of caries alone. But nothing could withstand such friction as had been kept up for years. The bristles did not cut the gold, but the enamel went on to destruction around the edge of the fillings. The younger brother, about forty-five years of age, had lost the six superior incisors from having been cut so far through the labial side that they broke off, and the lower were gone so nearly to the pulp canal as to endanger them. In fact, wherever he could bring the brush into action by abrasion across the surface of all his teeth, even upon the palatal and lingual sides, the effect was evident.

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* A paper read before the Odontological Society of Pennyslvania.

I had seen many cases where the teeth had been abraded, but these surpassed all.

In making up my decision, it was necessary to determine whether there could be such a factor as disease, in such cases, or whether it was from the brush and dentifrices, with washes, etc. Some of the best practitioners had held that there was some specific action going on in the secretions of the mouth, *but had never given the crucial test to substantiate their assertions.* My own experience, hitherto, had fully assured me that there was but one cause—the *Brush* and the incidentals. I could see nothing else in these cases, and so decided. I at once changed the whole state of affairs. Of the results of my diagnosis and prognosis I had no doubt. I selected them a small brush, and, as a powder, prepared chalk. They were directed to use the brush by simply placing it in one spot, and pressing the bristles directly between the teeth with a rotation of the brush ; not to rotate the wrist and brush up and down from the gums to cutting edges ; avoiding the old method of drawing the brush across the teeth ; not to consume more than two minutes after breakfast and supper, using powder but once daily. The denuded of abraded teeth were contoured with gold (Abbey's No. 5, soft), and by hand pressure. I have seen them twice yearly, ever since 1876, and I can assure you that no recurrence or spread of the trouble has taken place in the least.

There were many such cases about that time coming to me, and I felt it a duty to construct a brush which, from the study of these phenomena, would obviate or anticipate it. While I differ with many of you, I must repeat that I *have never seen a case where the teeth had been generally eroded, but could be accounted for by friction, and nothing else.*

There is one particular form of groove that has caused so many to believe it was from disease. It seems easy to attribute it to the brush, so long as the groove is a shallow concave ; but where the edge of the groove, on the side nearest the cutting edge, is an acute angle, and forming a sharp corner, the brush is not a factor. It would seem impossible to make such a shaped groove with a yielding substance like bristles. When it is carefully studied, however, one must admit it possible and certain. The brush, in nearly every case, has been driven across the surfaces of the teeth, in conjunction with powder, with a great force exerted upon the bristles, to press them upon the teeth, and produce friction. A groove, it will be admitted, is soonest made near and at the cervix by first wearing away the gum, when the bristles can touch the dentine. In many cases of rather flat teeth, the groove is lower. Sometimes not a groove, but indentation on the surface, with intervening patches of hard enamel untouched, or only partially so.

Now, when you consider how much force has to be brought to bear to keep the brush in contact with the teeth, and the brush being too wide and too long, with the bristles too close together, if a groove is made at all, then, as soon as commenced, and an edge or boundary line is made, the bristles can no longer keep on the line, but divide, and the body of the bristle—not its end or point—is constantly in friction against this line, making it at first as sharp as a razor, and keeping it so. If you could keep the bristles on this brink of the groove, then it could not occur.

Another reason why the groove commences at or near the cervix is, that there is less resistance to the brush from the neck being narrower ; besides, there is a less body of the tooth presented. It is there the gum forms a boundary line to control the bristles, to keep them in file in their ranks, standing up squarely to their work, while those on the flatter body of the tooth go straddling around as if intoxicated. Then, as soon as the slightest groove is made, the bristles are bound, like men, to go in the *rut*. When the cuspids, bicuspids, and molars are the prey, you never see these grooves except close under the edge of gum, never upon their broadest surfaces. There is one phenomenon that seems not to be in keeping with this explanation, and it is the unfathomable paradox to all who hold to a specific cause. How is it possible, while the brush is made to pass across the surfaces of the incisors, that, in addition to a groove or grooves, there should be a hill and plane surface produced? Why not the groove, as near the cervix? This is not at all wonderful. I am quite sure that no round face tooth was ever so defaced. That is to be found only in those cases where the enamel has given previous evidence of its surface being made up of cells of unequal value, which we so often witness? Who has not observed the surfaces of the hardest rock subjected to the constant attrition of water, and the débris therein, cut in a similar manner, whether the grain of the rock was lying lengthwise or crosswise. Something must give way where a force is exerted; and here, where the face of the tooth is flat, and the bristles can be kept upon the surface without straddling, if one portion is softer than another, there will be loss of structure irregularly. These reasons are sufficient to convince me that no other cause need be given for these phenomena. As soon as the excavated surfaces are filled, and the brush used in moderation and with judgment, there will be no recurrence in any case.

You will understand, from what has been said, that I consider all cases where the labial, buccal, and palatal surfaces are denuded, either in grooves, or when the broad surfaces of the centrals are involved near the cutting edge, it must be attributed to the brush and powders; yes, to washes also, indirectly. You will never find it where a brush has not been used. The only thing answering to the specific theory is around the cervix, where the brush has first worn the gum away, and caries taken the place of the brush—which latter can no longer be used without pain—and the parts are neglected. But it is of an entirely different nature from the hard, polished surfaces from attrition. While these surfaces are not so polished as those lower down toward the cutting edges, yet they are partially so, and the dentine is harder; nevertheless, it can be arrested at once by proper filling, as can all evaded surfaces, if the brush is also properly used. It matters not whether from disease or by friction, the remedy is all the same, and equally effective. If it were caused by specific action, nothing mechanically would avail. If I am not correct in my view, and a specific cause is at work, will it make the case any better by continuing to use the brush either across or up and down? Not at all. Take for granted we know no cause for this vandalism. Can we not institute some more philosophical means of grappling with this monster? Is there a brush that has ever been in the market, or in the private practice of any dentist, which has any claims to a construction that will reasonably do the work for which they were designed, and not cause mischief? I unhesitatingly answer, No!

What are the issues to be met? Will any one here say that, with the brushes to be had, he can cleanse the teeth without producing *pressure*, and the resultant *friction?* All will admit that, if the teeth can be cleansed, and well up under the cervical edges, without any possibility of abrasion on the enamel, and lacerating or wearing away the gum, it should be the practice. Can we hope to do this with such brushes as we are compelled to buy? It is absolutely impossible, without the greatest care and vigilance, to guard against the crosswise movement which is first learned in youth. It is kept up through thoughtlessness; the dentist, until within a few years, seldom called attention to the practice. It becomes a second nature, and when they *are* advised as to the extent of the mischief done by their suicidal hands, it is frequently too late.

Then, to cleanse the teeth, *we must produce more or less friction.* How shall it be done with the least pressure upon the handle of the brush, and what style or construction shall it have? And, further, shall any powder or wash be used, and if so, in what form? Should a wash ever be sold by any dentist, or advised? Let us look at the construction of the average brush. The handle is evidently made to allow the patient to grasp it with the whole hand; for, without this, it could not be held steady with such a mass of bristles at the opposite end. Look at the arrangement of those bristles. Four and five rows in width, and seldom less than two inches in length, and every bundle of them in holes as close as soldiers in solid column, ranging from soft to very hard, and no allowance in quantity made for the difference in their flexibility. Did you ever, for a moment, stop to think that such a mass was never designed to cleanse the human teeth, or those of any of the lower animals? Reflect how much pressure must be exerted on such a solid phalanx to drive them between the teeth. Should you be able to get them there, at what expense must it be upon the gums from the direct pressure alone; and, if any movement is made to create friction, the pressure must be constantly kept up, or the bristles will not for a moment remain, except upon the periphery of the tooth opposite the radius. You now see how in keeping the large handle is with the necessary force to be exerted from the dense column of bristles forming the apparatus designed for the end in view. How few of the bristles can be expected to reach their destination by any movement possible? The friction, of course, is immense. How much of the length of the standard brush at any one time, or at all, ever comes in contact with the teeth? In a word, how much material do you suppose can be dispensed with in making of a brush, and be more effective? How much smaller and shorter can the handle be, and give you control over the bristles while in the mouth? How much less friction can be produced for all practical purposes, without so much pressure as hitherto exerted upon the standard brush? How much time can be saved? How much more pleasure can be assured? How much greater inducement can be offered to those who now consider it a nuisance to brush their teeth? How much less risk can be guaranteed to those who know they have rather invited caries by their life-long attention, than they have benefited? How are we to please the baby and the older child, and not disgust them with such an enormous mouthful of what is more fitted for scrubbing steps than human teeth? Had I not fancied I could answer all these queries in the affirmative, I should not have troubled myself to tax your weary brains with the result of six years' labour and observation; I cannot let the matter pass without doing what I consider a duty and a privilege.

Then, if *friction* must be produced in order to cleanse the teeth, shall it be applied with a large or small brush; one thickly studded with bristles, or one with them far apart in length and width? Shall it be applied crosswise or lengthwise the axis of the tooth? Shall we use powder or washes, and how often, and what kind?

As the teeth are of various shapes, and all of them with rounded faces, I claim it is impossible to use the standard brush, even once a day, without injury being done to both teeth and gums. In the first place, then, as we must reach all the surfaces of the teeth, I adopt a stiff bristle and set it in rows lengthwise, double the distance apart of any other brush, and only long enough to cover about four teeth. There are three rows crosswise, and the holes in the handles are drilled to make the bristles converge or lean toward the centre, occupying but a trifling width on the face of the brush. Each row of bristles is pointed to give least resistance. The face of bristles are again rounded from side to side, to prevent them from touching the gums before the teeth. The handle is made short and small in every way, to prevent the hand from grasping it as if great force were to be exerted. It is flat, to allow the tips of the fingers merely to touch it, to keep it from turning or rotating upon itself. The brush is narrower at the end or tip, since the molar teeth are so much shorter than the others.

With such a brush the teeth would soon be slaughtered, if some special way of using it be not devised. *It is on just this point that all persons need to be educated.* The plan cannot be well applied with the old style brush. My theory is, the ends of the stiff bristles should be simply laid on the surface of the teeth, and, without forcing them across, press them down upon the faces of the teeth, and force the bristles between them like so many tooth-picks, pricking or piercing the particles on or between them; at the same time, make the slightest rotary motion, and never, at any time, enough to force them out of the spaces between the teeth. When one part is done, go around the mouth on all the surfaces. The arrangement and distribution of the bristles is such that the small handle is sufficient to press the bristles home with ease, and make it impossible to inflict any injury upon teeth or gums.

To still further make the friction less, the brush should be used immediately after a meal, and never before, while the accretions upon the teeth are yet soft. One very light brushing at the proper moment will be the most effective.

While Brush No. 2 will cleanse the palatal and lingual surfaces well, it can be done better with Brush No. 1, which is much smaller. If I were compelled to make use of one only, I would take the smaller, No. 1.

This *new feature* of direct pressure without lateral movement can only be done with a small brush—short and narrow, and but few and stiff bristles.

Here it is where the mischief is done, from having to force such a dense body of bristles on and between the teeth. This baby-brush meets the issue.

It is claimed that powders do much injury. I do not see it. Think again. The dry powder is taken upon the moistened brush, and as soon as it is in the mouth the saliva floods the brush, and the powder drops on the tongue, unless the brush is a very soft one. The mischief is done by the friction of the brush, and not by the powder. If we must use powders (and I grant they are very excellent), let us compound them with soap, or something to "hold the powder in solution," as the druggist would say. This would be sure to keep in the brush, and do execution without so much friction from the brush. I know of nothing better than the finest pumice incorporated in fine castile soap. The soap keeps the powder suspended, and, at the same time, prepares the surface of the tooth for the powder to do its work with least abrasion by removing the grease therefrom.

Shall washes be used in conjunction with a brush? I never sold such from my office at any time in my life, nor advised them. If the gums are diseased, no wash, such as is given to patients, will ever cure or harden them. The dentist should first cleanse the mouth and teeth, and remove all causes for future trouble, and make one or two applications of concentrated remedies. This will suffice; at least, it does with me. I can conceive of no motive in any first-class dentist recommending washes, further than from his ignorance of therapeutics, or a mere love of making sales.

I do not know that I can present the subject more clearly, except by personally demonstrating that the simplicity of their adaption is fully as philosophical as their construction; and the only improvement which I can now see, is to make them yet smaller and the bristles wider apart.

I will further state that the No. 1 is just what we want for our patent rubber and gold plates. It finds the secretions.

Now, gentlemen, I must beg pardon for brushing you up so sharply, and consuming so much time over a mere toothbrush. If I have transcended proper bounds and given you false philosophy, you have now a chance to set aside my teachings.

HYGIENE.*

By J. R. Woodley, D.D.S., Norfolk, Va.

It would be idle to assume before such a professional body, that the paper I propose to read is all original matter obtained from personal experience and observation; a knowledge based on these must needs be limited, and we arrive at last at the truth by interchange, and often by the surrender of our earnest convictions, and the combined opinions of the many who have attained what may be called the "*Ultima Thule*" of accuracy in scientific investigation. Such points as we are about to consider, will at least be the truthful deductions of a professional life spent in the offices and experience of a fairly large practice. It is far more important to learn to prevent than to learn to cure. The value and importance of teeth makes this branch of our profession broader and more comprehensive than might be supposed, and its importance requires that we should direct to it our closest attention. How many mutilated persons there are, who are afraid to smile lest they should display the disagreeable void, and who might have escaped the misfortune and conditions so prejudicial to their comfort and so inimical to their enjoyment of life, only for the lack of a little knowledge, and a little care—*so little* that conscious delinquency often adds not only keen regret, but little remorse to their cup of sorrow.

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* Read before the Southern Dental Association, July, 1886.

Hygiene includes several subjects for consideration.

1st. Articles of food which are injurious.

2nd. The influence of clothing and atmospheric vicissitudes.

3rd. What is injurious to the teeth and what preserves them.

4th. Cleanliness of the mouth, and all the means useful thereto.

Without dwelling further on general considerations, we will proceed to treat each of the subjects specially.

1st. Articles of food which are injurious.—Although the greater number of patients are heedless of advice on this point, it is our duty to point out such aliments as are likely to engender or prolong disease of the teeth, and such as are by no means hurtful. It may happen that a nervous lady subject to neuralgia, which affects the whole denture, may apply to us for advice, by following which she may hope to escape perpetual suffering.

Regimen is one of the most effective means to check this disorder. Usually animal substances are not so favourable to the preservation of the teeth, as vegetables. The difficulty which is found to attend the removal of fibrous residium of roast meat, from between the teeth, or to take away the glutinous plastering left by those which have been boiled, will sufficiently justify this saying. We must also deprecate the prolonged use of smoked and salted meats, the very unfavourable action of which is the cause of that terrible disorder—*Scurvy* (*Pyorrhœa Alveolaris* or *Riggs Disease*) which consists in continual bleeding of the gums, and the loosening and pain of the teeth. We are accustomed to regard sugar, and all substances that contain it, as very injurious to the teeth. This is, however, somewhat doubtful.

The negroes on sugar farms—who, during certain seasons of the year, eat almost nothing else—do not manifest any loss of the remarkable whiteness of their beautiful teeth, while at the same time they fatten on this diet.

We have at hand other examples of those who have long preserved their teeth, while they have immoderate use of sugar. Persons who mercilessly proscribed this luxury of childhood and old age, tell us that crystallised sugar, like other hard bodies, scratches the enamel, and ultimately corrodes it ; and that even syrup, or vegetable matter containing sugar, agglutinates the teeth, subjects them continually to the action of acids, and makes them the subjects of such chemical changes often as to induce caries.

Although chemical analysis does not detect in sugar any acid quality, it is certain that everybody who eats largely of confectionery must experience sensations about the teeth by no means encouraging to perseverance in the indulgence. Particles of sugar will remain between the teeth, and, undergoing fermentation, will as certainly induce a more or less acid state of the oral secretions. It is hard to get over the fact that workmen in sugar refineries generally have bad teeth, and the many girls who are employed in confectionery shops display teeth so ravaged with caries as to furnish sufficient evidence of their habit of partaking largely of the sweets they are employed to sell. Young girls of that age in which they are afflicted with *chlorosis* or *hysteria* often have an invincible propensity for devouring acid substances, such as green fruits, pickles, etc.

The use of alcoholic drinks is not less dangerous to the teeth. Supposing that their chemical action is not hurtful, they keep the mouth and gums in a state of irritation which affect the teeth. It is also a well-established fact that well water contributes effectually to alter the enamel. Two things confirm this : the chemical analysis of the water, and the bad state of the mouths of those who use it. In many localities where no river or pure water can be got, the inhabitants' teeth are generally bad.

2nd. Influence of clothing and atmospheric vicissitudes. —If the greater part of mankind will not listen to counsel about their food, they are yet more deaf to all argument on the matter of clothing, especially ladies, who do not fear to bare their necks and wear the lightest apparel in the middle of winter. Nevertheless, we must do our duty and point out the fearful consequences incident to atmospheric changes

Next to the lungs, the teeth are most apt to suffer from the daily imprudence committed in this respect. They may be affected directly or indirectly. Directly, by sharp stimulation which the cold imparts to the blood-vessels and nerves enclosed in the dental canal. Indirectly, by the sudden suppression of transpiration of some parts of the body, which is thrown upon the mucous membrane of the mouth, and thence upon the teeth themselves, producing local as well as general and systemic disturbance. Women especially, on account of their nervous and delicate organisation, are most sensible to slight changes of temperature. The best means of protecting themselves, is to contract early the habit of not clothing the person too heavily, and to take exercise in the open air. This, while it favours harmonious development of all parts of the body, gives to each part the power to resist morbid influences. As soon as there is a change of temperature, females should take care to clothe themselves suitably, especially when passing from crowded rooms where the exhilaration of pleasure, and the high temperature has excited them to the utmost; they must then be very careful lest they forget a caution most essential to health.

3rd. Things hurtful to the teeth.—Among the things that are most injurious to the teeth, we may rank first the wretched habit of using them for purposes for which they were never made. Persons who with their teeth crack nuts, bite threads, draw corks, and even nails, lift tables, etc., expose to premature destruction organs indispensable to nutrition, good health, and long life. In the category we may class smokers, in whose mouths the lateral incisors and the canine teeth are not only abraded by the stem of the pipe, but whose entire gums are kept in a state of perpetual irritation by the empyrenmatic oil, and acetic acid which is disengaged from the smoke. Cold is an enemy to the teeth. It is, therefore, a bad habit to drink ice-water or any other cold drink after drinking hot soup, etc. What shall we say of ices in the heated ballroom? Men seem to have a fatal instinct which impels them to do everything most likely to injure their health and teeth. Having enumerated some of the few things that militate against the preservation of the teeth, we will pass on to the general precepts which must be observed in order to their well-being.

4th. Cleanness of the mouth.—One of the simplest and most efficacious means of preserving the teeth consists in the local attention which we call cleanliness of the mouth. As this part of dental hygiene is imprudently neglected by some, and very carelessly attended to by others, I think it is the imperative duty of the dentist never to omit to give to his patients the details, even the most minute, which belong to it. Cleanliness of the teeth and mouth, by the educated and refined, is an admitted necessity to health and comfort, and its utility and preservation is generally acknowledged ; yet there are few, even among this description of persons, who regard it decidedly injurious ; and as an evidence of the correctness of their views, all of us during our practice have met with this class of believers, who have referred us to individuals of fifty, sixty, or perhaps even seventy or eighty years of age, whose teeth are perfectly sound ; who had never paid any attention to their cleanliness ; and to others not more than eighteen or twenty, who were known to be frequent and regular in its observance, whose teeth were deplorably defective. To persons unacquainted with the differences in the liability of the teeth of different individuals to become diseased, and the causes that produce disease, this might seem to be a very conclusive argument, but to one having a knowledge of all the facts it only proves that in proportion as these organs are hard or soft, their power or capability of resisting morbid impressions is increased or diminished. Hence, teeth which are hard rarely decay ; whereas those that are soft decay from the most trivial causes ; and thus it is that some occasionally retain them to an advanced period of life, while others, and that too very frequently, lose them before they arrive at anything like what is usually denominated middle age.

It often happens, however, that persons who are possessed of the hardest kind of teeth, lose them early in life by the destruction of their supports, or (what is now termed Rigg's disease, &c.) and it is worthy of remark, that the loss of the teeth in this way is generally confined to those who pay little or no attention to their cleanliness. With those who are, and have been from early childhood, in the frequent and regular observance of this habit of cleanliness, such an occurrence rarely, if ever, happens, and the reason is obvious. By cleaning the teeth regularly, two or three times a day, the formation of tartar is not only prevented, but such particles of food and other extraneous matter as lodge about and adhere to them, and which, when permitted to remain, soon become putrid, vitiating the fluids of the mouth, and causing them to irritate and inflame the gums, and in consequence to be absorbed, together with the alveoli, are also removed. That there is a more general tendency in some than in others to disease of the gums, we do not deny, but this, by proper care and attention, might, we believe, in almost every instance, be counteracted.

My opinion is, that the gums, if the teeth be kept perfectly clean, seldom become spongy, or recede from the necks of the teeth, and teeth that are in healthy gums rarely, if ever, loosen much in their sockets. If this, then, be true, the importance of a strict observance of the cleansing of the mouth, cannot, if for no other purpose than the keeping of the gums healthy, and the prevention of the loosening of the teeth, be too strongly urged. Cleanliness is a prophylactic against disease of the teeth themselves, or at least of their crowns, is also powerful, I might perhaps say certain, for were it possible to keep them perfectly clean, I believe they would never decay. But this, literally speaking, is hardly practicable. The enamel on the proximal surfaces of the teeth is often fractured, and within these fractures and the indentations on the grinding surfaces of the bicuspids and molars, a lodgment is afforded to small particles of extraneous matter, and the secretions of the mouth that cannot, by any of the ordinary cleansing methods, be reached, and remaining there until vitiated and putrid, exercise upon the parts with which they come in contact an exceedingly hurtful influence. But if cleanliness was carried as far as practicable, the teeth would be much less frequently affected with disease ; in fact, I do believe that decay would be reduced seventy-five per cent., and in this opinion I am convinced that everyone whose attention has been directed to the cleansing of their teeth frequently, regularly, and thoroughly, have altogether and far better ones, than those who have neglected it, or who, if they have attended to it at all, have done it irregularly. This has been noticed in families, and in those cases where the members resembled each other in features, constitution, temperament, and in the shape, size, colour, and arrangement of their teeth. Enquiries in almost every instance have tended to the confirmation of this opinion ; nor could it be otherwise, for to the presence of putrid foreign matter and vitiated oral secretions, are most of the diseases of these organs due. The fact, then, that cleanliness of the teeth is essential to their health and preservation is established, a motive sufficiently strong for its observance is no longer wanting. But where this is not the case, others, though of comparatively much less weight, might be urged. Of these the principal and only ones which we, at this time, will notice, are personal appearance and comfort, and upon them we shall offer a few remarks. To a pleasing and agreeable expression of the countenance, a clean and healthy denture is of the greatest consequence. Even if the teeth lack that perfect regularity of arrangements which is desirable, if they be free from tartar, viscid mucus, and extraneous matter, their appearance will never be disagreeable ; but if any of them, more especially those occupying the anterior part of the mouth, be discoloured, or covered with clammy mucus or tartar, or any foreign matter, they will rarely fail, however regular the other features of the face may be, to give to the countenance an unpleasant aspect and expression ; however scrupulously careful persons of either sex may be in regard to their dress, and although they may be decked with jewels, and sparkle with diamonds, if they at the same time be unmindful of a proper attention to the cleanliness of their teeth, they will fail to excite, in individuals of refined taste, that feeling of admiration which they most desire to elicit, and which these organs, when requisite care has been bestowed upon them, always attract. As essential as this is to personal appearance, is is equally so to the comfort of the individual, and I may say to the comfort of the dentist, for all of us have had the experience of inhaling the fragrant and odoriferous breeze that is often wafted to our olfactories from a diseased and filthy mouth. It is also requisite to health, for in proportion as the teeth are unclean, especially those of persons who have delicate constitution, is the appetite impaired and the digestive organs weakened ; and thus capability for enjoying life is often greatly diminished. But to enter into an explanation of the manner in which the health of the general system becomes afflicted by the lack of proper attention to the teeth, constitutes no part of our present subject ; it may, however, from what has been said in regard to its effects upon the organs themselves, upon the gums, and alveolar processes, be very readily inferred. Having now shown the importance to the health and preservation of the teeth, by keeping them constantly clean, I shall endeavour to describe the manner by which it is to be effected, premising that if they, or the parts within which they are contained, be diseased, such means as are necessary to their restoration to health, should first be resorted to. This done, all that will usually be required to keep them them clean, will be a tooth-pick, a brush, and pure water.

The pick should be a goose-quill, and should always be used immediately after eating. As regards the kind of brush to be employed, there exists a considerable diversity of opinion ; some prefer a very hard one, others a medium one, while others think a brush cannot be too soft. I am decidedly inclined to the medium. A tooth-brush should be neither too hard nor too soft, but of these qualities the last is the least objectionable, and for a child is, perhaps, preferable. The bristles should be of such length and elasticity, as to reach and act upon all the irregularities of the teeth, each bristle acting as a tooth-pick, when a rotary movement is made upward and downwards. With such a brush as this, and water, the teeth should be thoroughly washed several times a day ; —say, for instance, in the morning immediately after getting up, and after each meal. This cleansing process should be commenced in early childhood, and if it be carried to a sufficient extent, it will prevent the teeth from becoming stained or discoloured, and keep the gums healthy. Harmless dentifrices, such as powders, lotions, etc., may be used beneficially in healthy mouths, if such persons desire it. Care should, however, always be observed, as to the chemical and mechanical character of mouth-washes and dentifrices ; as sad and irreparable damage may be inflicted by the employment of an acid or strong alkaline mouth-wash ; or by a gritty and sharply mechanical tooth-powder.

MEDICAL EDUCATION FOR DENTISTS, AND DENTAL EDUCATION FOR PHYSICIANS.*

By B. H. Catching.

Dentistry, as an art, has made wonderful progress. Dentistry, as a branch of medical science, had advanced very slowly. The establishment of distinct schools for the purpose of teaching dentistry, and the creating of a separate degree, were mistakes that have, from their inception, been drawbacks to our advancement in medicine. It would have been better, when we were denied the privileges of medical colleges, to have established schools of medicine and taught the whole course, conferring the degree of Doctor of Medicine, instead of going apart and establishing distinct schools and creating an independent degree.

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* Read before the Southern Dental Association.

It is true that we have attained some distinction, which has been done by persistent labour at great disadvantages. This limited distinction was not acquired through those who depended alone on our schools, but on advantages obtained in schools where medicine as a whole is taught.

For fifty years we have been endeavouring to persuade the world to believe that we are specialists in medicine. That they have been so slow to believe it, is not remarkable when we consider our foundations for such assertions.

It is an unreasonable request to make on our part, when we neither teach nor graduate as such, and continue to work under creatures of our own, in which medicine plays so small a part.

I do not wish to be understood as striving for medical recognition, though that would be laudable. But I do wish to be understood as desiring to place dentistry on a plane where it will command the highest respect of the people and have accorded to it its full sphere of usefulness. It is commonly believed that the only requirement necessary for becoming a dentist, is a mechanical turn of mind, and that the only education necessary is to develope and train such a mind.

This, I am sorry to say, is not alone the opinion of a large majority of the people, but of a vast number of dentists, who have been taught and practise simply the mechanical.

Our separate schools and degree have forced this conclusion on the people, and we can never change it until we change our system.

Surgery is mechanical, but it is not vulgarly accepted as a trade, because it carries with it, and is intimately associated with, medicine. As with surgery, so with dental surgery. If we were alike possessed of such knowledge.

If we wish to be a part of medicine and surgery, we must accept teaching necessary to qualify us for it. We must do away with separate schools and the distinct degree. We must educate and graduate from regular medical schools under one common degree.

Separate schools do not create that desire necessary for the successful prosecution of a learned profession. Their teaching is too limited for expanding the mind to nobler and higher attainments.

How can we claim to be practising a science so high, and so broad, and so grand, of which we hardly know the first principles?

In theoretical medicine we are taught to a very limited degree, while in clinical medicine we are not taught at all.

The establishing of boards of different kinds clearly indicates our lack in this respect. And, while they may accomplish some good, yet it is not to them that we are to look for relief.

The plodder will be content with our limited teaching, but the progressive and ambitious will look elsewhere for that knowledge, not obtainable in our institutions, for the proper prosecution of a branch of the healing art.

It was thought, when universities established dental departments, that every requirement had been met. When they are conducted in connection with the medical departments, they are an advance toward better medical teaching; but when they are conducted apart from the medical departments, they are no better than dental colleges, and are, in fact, nothing else.

Admitting this to be an advance, we must not stop here. Humanity demands that we prepare ourselves more thoroughly for healing her ills and correcting her defects. Shall we longer refuse this demand? Can we afford it? I say not. We must have every advantage offered for the highest education in a calling so nearly related to divinity itself.

I will say in conclusion: Do away with dental colleges, do away with university departments, do away with the degree of D.D.S. Return to the reputable medical colleges, enter and come forth as doctors of medicine, and then enter a dental infirmary, in which the highest type of practical dentistry is taught; and then we will stand fully equipped to practise dentistry as a speciality of medicine.

I do not wish to convey the idea that we should accept the teaching of every medical college; far from it. There are too many of them nothing but catch-penny establishments, caring little for the manner of their teaching, and less for the qualification of their graduates. While we are not here to read lessons to medical colleges, yet we can appropriately urge them to establish chairs of dental surgery, and teach it as applied to medicine. It would not only be a vast benefit to the physicians so taught, and a blessing to the people, but it would cause a higher appreciation of educated dentistry, and redound to our good as well as to their glory.

British Journal of Dental Science.

LONDON, OCTOBER 15, 1886.

DIRECT REPRESENTATION OF THE MEDICAL PROFESSION ON THE GENERAL MEDICAL COUNCIL.

As we recently pointed out, the politics of dentistry have, outside its own precincts, no *locus standi*. The dental profession is, in the eyes of the legislature, in the eyes of the surgical and medical world, simply a branch of the body politic of medicine.

That we, among ourselves, have more ambitious aim than should belong to a non-representative pendant, matters little either to the legislature, or to the aforesaid body politic; they are not ill-pleased that we should amend any flaws which might sully the fair fame of the profession at large, and they even encourage efforts directed in that direction. We pointed out that the profession which we represent may, however, hope to have wider aims, and a broader basis upon which to found its policy.

It is unquestionably within measurable distance that we should exist as a body politic, standing alone, directing its own interests, and working for its own improvement and consolidation. Of course, there are many who, following out a now effete line of criticism, will wag the head and scornfully mutter, "dreams"! The world is full of such men: either they must be prime movers themselves, or they will disparage those who strive for reform; it is a mixture of the spirit which caused the dog of olden time to resent intrusions into the manger which, alas! he could not attain to. Now the dogs are muzzled, but the really more rabid animal, man, is neither led by a chain, nor in any sense is under control.

That we at present have really no *locus standi*, no direct influence either at the colleges or in the legislature, cannot be questioned. Happily for us, we have in our midst those whose moral influence is great and widely felt, and who are thus able to help us by their mere personality, acting upon the powers that be, and for such men we may be devoutly thankful. At the same time, such a method of pushing one's claims is not altogether satisfactory, nor does it redound very largely to the credit of the profession.

The remedies for such a state of affairs are not so readily found, and, even when discovered, are not so easily applied as one could wish ; still, remedies there are which, even if they act slowly and after the expenditure of much individual labour and zeal, yet are sure in the end to triumph over all difficulties and red tape-ism.

The General Medical Council, which practically is the parliament of the medical profession, sways not only the destinies of physicians, surgeons, and general practitioners, but controls our affairs as dentists, erases names from the register, takes cognisance of irregular professional conduct, and, *in fine*, governs the body politic of dentistry.

At the present time—thanks largely to the exertions of Sir Walter Foster—the medical profession are to have the choice of three direct representatives of themselves upon the Council. The importance of this is great, not only to them, but to us ; very many among our ranks have votes, and still more can command votes. Under such circumstances, it becomes a matter of great moment that absolute union should exist among all dentists who possess influence, that they may turn the election into a channel which will ensure the representation of their own interests, as well as those of the medical profession at large.

The advantage to us at present of our students taking the double qualification is very great ; it is the chiefest way we have of winning our way to centralisation and autonomy, and so should be encouraged and inculcated with the utmost earnestness.

Among the many candidates who have come forward to contest the three seats—three have been specially singled out by a self-appointed committee—are Sir B. Walter Foster, Mr.

Wheelhouse, the eminent surgeon, and Dr. Glover, a member of the staff of our contemporary, *The Lancet*. It is not for us to attempt to weigh in the balance the merits these gentlemen have or have not, but rather to remind our readers that it is not always the best friend of medicine and surgery who takes the widest and fairest view of dentists and dentistry.

As a rule, medical men know very little indeed of the dentist's art, and have but little of common interest with the dentist ; it is usually only those who have frequent dealings with dentists who are in the least *en rapport* with dental polity. They barely appreciate our struggles ; nor do they estimate the advances scientifically, socially, and in all ways, which have characterised the progress of our profession during the last ten years. To them, dentistry needs no particular future, so our aspirations after further progress are of little moment, hence it is that if any real advance is to be made in the dental polity, it must originate among ourselves, and not through the bye-channels of the medical profession.

At the same time, we must bear more or less upon medical aid in the first instance, and until we possess a legislative recognition. The present election, then, offers an opportunity which should not be allowed to slip past. Let all interest themselves and aim at union, and it will be found that we possess far more power to influence an election of this kind than is commonly conceded to us.

COCAINE AND ITS CONSEQUENCES.—Hardly does one take up a journal without finding some harrowing tale told about some unhappy patient who sunk to unconsciousness of pain through the kind, benumbing effect of cocaine lethe, evinces alarming constitutional symptoms, heart failure, dyspnœa, and so on. We wish our readers to remember that cocaine, valuable as it is, is yet a really dangerous agent, and one the use of which needs great circumspection and care.

THE "ENTRIES."—It is premature as yet to speak with any precision, but we believe it is an open secret that nearly all the general hospitals have done much better this year than was the case last year. The dental schools have, we understand, no cause to complain, having already done much better in numbers than in October, 1885. It is noticeable that among the entries there is a much greater number of men going in for the "double qualification." This is as it should be, and we hope that each year will increase the number.

DENTAL FICTION.—We confess our caption is misleading; we don't wish to have it understood that we refer to "improvements on fact," fathered by the brethren of the forceps; for, by dental fiction, we only mean fiction which deals with matters dental. In a dental comtemporary, we have the privilege of seeing a clever novel worked up out of the adventures of a dentist; and now, in a most charming collection of stories for children, we come upon a story all about a "queen dentist"! These stories, published by Skeffington, of Piccadilly, are plaintively called "Just One Tale More!" but the kind-hearted publisher has told several more to the delighted Ethel, Dora, and all the rest. But the one tale which interests us is by a learned and grave divine, the Rev. Baring Gould, who had taken his inspiration from a travelling mountebank whom he calls a "queen," who is trumpeted before, and poses as a humanitarian tooth-puller. Save the mark! All the contents of this book are really pretty, but the "dentist queen" is hardly worthy the pen that wrote the narrative.

DENTAL ANOMALIES.—Lots of such are daily taken out of lots of heads, but, besides gratifying the immediate friends and patients of the operator, are usually lost to the world. This is a pity. It is usually due to the fact that it is sometimes difficult to show the abnormalities, as a man doesn't care to come perhaps a mile or two to show one specimen. Why not arrange for a periodic show of "sports," or, as is done elsewhere, have card specimens? The pathological specimen is shown, and a brief description written on a card. This dispenses with the wearisome "talky-talky" which so often passes for explanation, when such is given *viva voce*, and by any inexperienced orator. In the *Cosmos* several correspondents mention the following specimens: Five cuspids with two roots each; five bicuspids, each having three distinct roots; twelve lower molars, three-rooted; three lower molars with four roots; one lower molar with five roots; twelve upper molars, four-rooted; two upper molars, osseous union; two lower incisors, osseous union; four cases of osseous union of temporary upper central and lateral; also, quite a number of third lower molars, incisors, and cuspids of the most extraordinary and curiously-shaped roots; five upper molars, fine specimens of exostosis; one lower molar, entirely incrusted by a large mass of salivary calculus; a cuspid and bicuspid, each one and one-quarter inches in length; also an upper and a lower molar, regularly shaped, but of extra large dimensions. All of these teeth have been extracted by Bernard Hess, D.D.S., New York, in the course of his practice.

Double-rooted Cuspids.—Within the last six years, Mr. W. C. Bunker has extracted three such, having two distinct and full-length roots. They were all extracted from the lower jaw, two being from the mouths of females, and all from persons past thirty years of age. Two right lower molars are also described, the first and second, taken from the jaw of a man about twenty-eight years of age, each of which has three roots as large and divergent as any superior molar; also a right superior central and lateral incisor, the roots of which are fused for more than one-half their length; the enamel is also perfectly fused for fully one-half of the distance, beginning at the gum line extending toward the cutting edge. This was extracted from the mouth of a lad thirteen or fourteen years of age. Mr. Isaac Douglas has in his possession a triplet, extracted from the mouth of a boy somewhat less than three years of age. It represents the right upper lateral incisor and cuspid, with a supernumerary incisor partly between and partly to the labial side of the others, making quite a prominence. They are united from end to end, though the crowns are but slightly united. Another triplet was taken from the mouth of a little girl.

It occupied the same position as the other, and was composed of the same teeth, the supernumerary occupying a more intermediate relation than in the other case, and prominent enough to interfere with the regularity of the arch. These roots are united nearly to their apices, the supernumerary being a little longer than the others, which is not usual with supernumeraries. A superior left central incisor is described by Mr. M. Palmerston, having two well-marked roots. This tooth he extracted from the mouth of a lady aged thirty years. T. D. I. writes : "I have a patient with two well-developed left superior lateral incisors. They are in normal position, and so are all the other teeth except the central of that side, which I removed from the gum lying upon the lateral under the lip."

Abstracts of British & Foreign Journals.

SOUTHERN DENTAL JOURNAL.

NERVE CANAL.*

By JAMES S. KNAPP, D.D.S., New Orleans, La.

THE writer deals with the treatment of the contents of the pulp chamber and canals, and the filling of the same.

As to the probabilities of success in retaining the vitality of the pulp when once caries has proceeded so far as to expose this delicate and important tissue. Dr. Knapp thinks as a general rule, exposure of the nerve is soon followed by the loss of its vitality. About forty years ago, Dr. Hullihen, of Wheeling, Virginia, mantained that an operation called "risodontropy," which consisted in drilling through the cervical part of a tooth till the nerve canal was reached and its contents punctured, would usually result in the pulp slightly receding from the point of exposure at the bottom of the caries, while its vitality through its entire length would be preserved.

Although, probably, this is a mistaken theory, yet a tooth so treated seldom gave trouble, for, if suppuration ensued, the opening thus made gave ample opportunity for the escape of the vitiated secretion.

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* Read before the Southern Dental Association, July, 1886.

During the last 25 years, the best American operators have ascertained that, in most cases of exposed pulp, and especially those in which this delicate tissue has become diseased, it is better to remove it entirely and fill the canals, if possible, to the foramen, and then the chamber and the cavity of decay.

To remove the pulp, if it is suppurating, is more easily done if that part of the crown is cut away which is in the way of entering the canal or canals, and this portion of tooth substance is, of course, to be replaced with whatever material is used in filling.

The opening into the canal should, of course, be enlarged and made funnel shaped, so as to facilitate the passage of whatever instrument is used for the removal of its contents. The barbed broaches prepared and sold for this purpose are usually too large and clumsy to enter any of the nerve canals except those of the anterior teeth of the superior maxillary and the palatine root canals of the superior molars. A delicate hook may be formed at the end of a small untempered broach, and with this success is more certain. However, it may be remarked that, with orange or osier wood properly and delicately pointed, and placed at the entrance of the canal, and then gently tapped two or three times with a mallet, the pulp will be found either to adhere to the wood on its withdrawal, or that it has been pressed to one side of the canal, from which it can generally be removed with a broach on which has been tightly wrapped a little cotton.

If there be no signs of a sac at the apex of the root, there can be no objection to filling the canal or canals as soon as they have been deprived of their contents; and again, if there be a sac and from an opening through the plate of bone adjoining it, and the superimposing gum tissue, giving an outlet externally for the escape of the pus, there is no objection to filling the nerve cavity at once, for the abscess can be better and more successfully treated through its external opening.

In all cases in which pus originates in a sac escaping through the canal and out of the cavity of decay, the foramen must be a large one, and treatment should be by antiseptics for a week or ten days previous to its formation being entirely arrested, and a healthy action reinstated, and the root canal thus be ready for the filling.

Among the materials used for plugging the canal, gold, lead, Hill's stopping dissolved in chloroform, and the wood of the orange, osier (or willow) have all been successfully used. The one most easily used is osier, the nicest sticks of which should be selected, and shaped as nearly as possible to fit the canal into which is to be driven.

A notch may be made around the pointed wood at a distance from its end a little greater than the length of the canal, and the wood, after being dipped in carbolic acid, has been driven tightly into the canal, it is easily twisted off at the notch. Wood, it is believed by the writer, in this way may be so prepared and used that it will come as near to filling the canal to its apex as any other substance.

GOLD—COHESIVE AND NON-COHESIVE.*

By Theo. Johnstone, South Carolina.

This paper explains the process of preparing cohesive and non-cohesive gold for filling teeth ; every dentist should become thoroughly acquainted with the way in which gold is thus prepared.

It should, the writer thinks, be taught in every dental college in the course on Chemistry.

Cohesion is that force in the particles of matter, whereby they are connected in such a way as to resist any attempt toward their separation.

There is a difference between welding and cohesion.

Gold surpasses all other metals in malleability and durability; it is compressible and expansible, is also very tenacious ; it is not affected by air or water at any temperature ; the ordinary acids fail to attack it singly, though it will readily dissolve in nitro-muriatic acid, the active agent being the liberated chlorine.

To insure welding, absolute purity of gold is essential.

There are different methods for refining gold. The alloy is to be freed from all dirt, then, by passing a magnet through the scraps, loose particles of iron are removed. If there is much silver in the mass it is well to dissolve it in nitric acid. From this the mass is transferred to a vessel containing a mixture of one part of nitric acid and two or three parts of muriatic acid, which should be made at the time the gold is to be dissolved, and heat applied also to hasten the solution ; filter to separate the chloride of silver and evaporate the filtrate to nearly dryness. This solution contains the chlorides of the remaining metals of the alloy, from which the gold is to separated by precipitation. It is to be largely diluted with distilled water, and a solution of sulphate of iron gradually added, when the gold will be seen to fall as a dark brown powder, which may be collected on a filter, well washed and dried, and fused with borax in a crucible.

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* Read before the Southern Dental Association, Nashville, July, 1886.

Oxalic acid is sometimes used instead of the sulphate of iron, and the gold is said to precipitate in a spongy form.

With care, either precipitant, if all the chemicals are pure, gold is obtained in a pure state.

This nugget of gold is taken from the crucible and subjected to the rolling machine or hammered out till it is pressed into sheets of desired thickness.

These sheets usually vary in weight of two grains, so the numbers run 4, 6, 8, 10, and so on. A leaf of number 4 gold foil should weigh four grains. So do the other numbers also indicate the respective weight of the foil. As to the so-called cohesive properties, pure gold, when properly annealed, will, under pressure, weld as two pieces of iron. In welding, purity of surface, with sufficient pressure and heat, are necessary.

All matter is more or less porous. The atoms of which it is composed are so arranged that they do not everywhere touch, thereby leaving interstices.

These interstices seem to be occupied by heat; from this fact a piece of iron is made smaller by hammering. Its particles could not be brought into closer contact if there were no interstices. If the piece of iron be rapidly hammered on an anvil it may be made red-hot; the particles being suddenly driven together, the latent heat is forced out. When a metal is thus deprived of its latent heat, it loses its malleability and ductility; it becomes stiff and brittle. Subject it to heat, its molecules will expand, thereby producing the same interstices to a size greater or less than their former size, according to the degree of heat to occupy them. The metal will again become soft, malleable and ductile. It is for this reason we anneal gold in swaging plates for artificial dentures. In reducing the gold to foil, its particles are pressed together, and deprived of its interstices and latent heat. This foil is dense and stiff; so it must be annealed to reproduce the interstices and latent heat which are necessary to make it weldable.

The manner of welding iron and gold is quite different, yet the principles are the same. Iron is heated to a soft or pasty condition and sprinkled over with sand in order to convert the superficial film of oxide of iron into a fusible silicate, which is forced out from between the pieces when hammered. Clean surfaces of the metal are then brought into direct contact with each other, and union readily takes place.

In welding gold no sand is needed, for the gold does not oxydise ; it is much softer than iron ; consequently its welding heat is less. As it is prepared for us, all that is necessary is perfect purity of surface and sufficent pressure to weld it.

To make the non-weldable gold, we simply coat the surface of the pure gold with a substance that will prevent direct contact of its particles. Ammonia gas is sometimes used ; the writer prefers flowers of sulphur. It is not so readily liberated by exposure. When, however, this gold is sufficiently heated, the sulphur will unite with oxygen and pass into the air as sulphurous acid gas, so leaving the surfaces of gold pure, which again becomes weldable.

DENTAL COSMOS.

OBTURATORS.

By P. I. Friedrichs, D.D.S., New Orleans.

Dr. Kingsley is quoted to the effect that, while obturators are a hard, immovable body, fitted to plug or stop an aperture with well-defined borders in the hard or soft palate, due to congenital or diseased conditions, an artificial velum is made of a flexible material, acting as a movable valve, and never applicable to openings in the soft or hard palates. The writer of the paper takes exception to this last statement, maintaining that, for openings in the soft palate, artificial velums are the most serviceable.

He believes that the irregular concavity formed by the upraised soft palate cannot be successfully done with a hard material. We must use something which will conform and adapt itself to the changes which are occasioned by the movements of the palate. These conditions can only be fulfilled by a material that is soft, flexible, and elastic in its nature ; and, furthermore, it is absolutely requisite that the material used be *non-irritating*, because, in acquired lesions of the soft palate, this membrane is peculiarly susceptible to irritation; and, therefore, any undue pressure or irritation may cause serious inflammation, and thwart our efforts to benefit the patient.

Kingsley's obturator, adapted to an opening in the soft palate, is discussed. In this case the obturator is made of vulcanite, and passes through the opening, its flange resting on the superior surface of the natural palate to prevent its dropping out of the opening. Here we see a method employed similar to that which was in use three hundred years ago, and of which he says, "The principal objection is, that it would prevent a final closing of the aperture from natural causes; experience having shown that in many cases where the aperture is only bridged over, healthy granulations form, and ultimately the gap is completely filled."

Bourdet, writing in 1756, is quoted to the effect that palatal apertures due to disease may, in many cases, close by themselves.

Other authorities are cited as corroborative evidence of Bourdet's teaching.

If to simply cover the aperture is the true principle (and beyond a doubt it is), the mechanism of Kingsley's apparatus is a direct violation of this principle, because an obturator passing through and beyond the opening would preclude the possibility of a closing ever taking place.

A case of ulcerative lesion of the soft palate was recently treated by Dr. Friedrichs. The patient, a lady about forty-eight years of age, apparently in good health, was sent to him by her physician for the purpose of having an obturator made. He knew very little of the previous history of this case. The lady told him that this opening had been a source of extreme annoyance, as her food and drink regurgitated through her nostrils; her speech, also, was rendered indistinct.

Upon examination, an aperture was found situated one quarter of an inch in front of the uvula, its largest diameter being divided by the median line. The patient was at the time wearing a partial plate of vulcanite. This plate fitted poorly. The attachment consisted of a strip of 18-carat gold plate, one-quarter of an inch in width, and long enough to go beyond the aperture. Rolling out this strip of gold from gauge 26 to 33 gave to it a springiness sufficient to follow the movements of the palate. Dr. Friedrichs next took the thickest rubber dam obtainable, and cut a disk of sufficient size to cover the aperture. This disk was then riveted to the gold strip; this strip with the disk attached was then permanently fastened to the rubber plate, and so adjusted that the rubber disk would cover the aperture. This arrangement proved a perfect success, keeping the aperture closed during the various movements of the palate, and affording all the relief that the patient could desire.

After the lapse of a week, an impression was taken for a new plate. The rubber disk was seen to be beginnin to become softened and lose its elasticity, so that the edge would roll and curl upon itself, thus imperfectly covering the perforation. Hence it was clear that it would be necessary to change the disk as occasion required, and this could not be readily done so long as it was riveted. A method of fastening was devised by which a new disk could be adjusted in a few minutes. This was accomplished by cutting two diagonal slots on each edge of the gold strip, converging to a common centre and to a depth so as to leave about an eighth of an inch between the incomplete V-shapes formed by the slots. The rubber disk is punctured in its centre, and passed through the slots, and is thus securely held *in situ.*

This device answered well. A change of disks had to be made once in every three or four weeks. After wearing this apparatus a short while, the aperture was found to be closing, and it is believed that in due course of time a natural closure will take place.

His conclusions as to what is requisite in lesions of the soft palate are :

1. An attachment that will follow the movements of the soft palate without causing any irritation.
2. A covering material which is non-irritating, soft, flexible, and elastic, and this adjusted to the attachment so as to perfectly cover the perforation.

Perforations of the hard palate may be treated by very simple methods. A plate made of metal or the vegetable bases will answer every purpose and accomplish desired ends. When the arch still retains some of the teeth, the obturator may be attached to them by means of clasps, and nothing further is necessary but to make the plate accurate, neat, and delicate, so that it may be worn with comfort.

ITEMS OF INTEREST.

LABORATORY HINTS.

By Dr. L. P. Haskell, Chicago.

After grinding the ends of teeth, sand-paper them, to smooth them.

For polishing gold and other metals, drive a piece of pine into a lathe chuck, and then turn it to a point, with a pocket-knife. He recommends this for finishing backings and the palatal surfaces of gold plates.

Use small-sized, soft brushes for polishing, as they retain the polishing material, coarse ones throwing it off.

An acid dish made of thick sheet lead is superior to any other for sulphuric acid, which is the only acid needed for metal plates. It can be easily formed with a mallet, over a wood form. Cut the lead so that a handle can be left on one side.

In soldering, have the plate clean, use plenty of borax, cut the solder in small pieces, and heat the whole plate, so that plate and backing shall be of uniform temperature before concentrating the heat of the solder. The melting point of the solder should be near that of the plate ; otherwise, before the plate is hot enough, the solder melts, and rolls away from where it is laid. Never use a lower carat than 18, even if your plate is 18.

Riveting pins are unnecessary ; countersink the hole, and it should be a little larger than the pin, and then the solder flows into it around the pin.

He prefers investing the teeth as arranged on the plate, and then backing ; it saves heating and time. It is best to round the end of the backing, and chamfer the edges.

After annealing a plate, drop it into the acid ; the surface being cleaned, you can see any base metal that may adhere in swaging.

There is such a thing as over-swaging a plate to be guarded against.

TREATING AN EXPOSED PULP.

By Dr. W. H. Atkinson, New York.

If the pulp is sufficiently exposed, we can very readily see whether there is a drop of pus formed at the point of exposure. If there is, the character of that is almost certain to be a favourable indication of saving the pulp. Remove the pus, and then apply almost any of the carbo-hydrates—the saturated solution of salicylic acid. Then dress it with a little sandarac varnish, pretty well dried down, so as to keep out all foreign substances. The next day, if pus has been formed and you get a drop of pus, you should cover it up. A little oxide of zinc mixed into a paste with half creosote and half oil of cloves, should be applied first ; then oxy-phosphate of zinc covering that. The patient, if in pain, should come the next day ; if not, in a week. Let it go for some time till satisfied of the extinction of the mischief. If there should be any trouble, it is easy to take out the oxy-phosphate filling and re-dress, but never destroy a pulp for that. When pulp stones are attached to the sides of the pulp chamber, and you cannot take them out, then, and then only, Dr. Atkinson thinks its justifiable to destroy a pulp.

Where the pulp is a little exposed, and there is considerable inflammation, but no drop of pus, Dr. Atkinson recommends bleeding it. The first step to relieve congestion, is to excise the exposed part and let it bleed freely.

Dr. Atkinson believes a pulp that is congested is capable of being preserved. For, whenever congestion is carried to the point of transudation, there is a variable arrest of the circulation that needs relief ; and when that is responded to, and the other portions are sufficiently fluid to keep up their wonted circulation round these little ponds or lakes—they are like varicose veins—then cut that out, and it recuperates itself by simple treatment.

INDEPENDENT PRACTITIONER.

PAIN OBTUNDERS.*

By A. W. Harlan, M.D., D.D.S., Chicago, Ill.

It is not the case that, in all cavities, drying, and the use of a sharp excavator, all that is necessary for the obtunding of the dentine has been done. It is essential to thoroughly dry cavities in general before much excavating has been done, in order to avoid producing pain, but complete dryness is not sufficient, not even when the air is continually heated.

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*Read before the Indiana State Dental Society.

It is not practicable to produce a continuous stream of heated air unless it is compressed. It is not certain that the useof heated air for any considerable length of time may not be injurious to a tooth, by driving off too much moisture and checking the enamel so seriously as to produce leakage around a gold filling. The writer believes he has seen evidences of this in pulpless teeth. The only practical method of using heated air for obtunding sensitive dentine, is to direct the jet on the cavity for a half to a whole minute, and then introduce, with a pipette or dropper, the obtunding agent, which may be alcohol, ether, carbolic acid, in a generous solution, or other local anæsthetic. This should be continued for about two minutes, and in most cases the patient will not shrink when the excavator is used. The rubber dam must be used in every case. Every one must remember some case where it seemed impossible at the time to properly prepare the cavity in a tooth so that a respectable operation could be performed. This method will, undoubtedly, help some one in just such cases. Much cannot be accomplished by using an ordinary bulb-syringe. An air compressor having a pressure of from forty to sixty pounds to the square inch, is recommended. If the heated air is directed from the cylinder, the pipe or taps must be protected with a non-conductor by having a coiled tube about eighteen to twenty-four inches from the mouth of the patient; a small gas jet or spirit lamp will produce all the heat needed. As the stream of air comes from the compressors through the heated pipe, you can have a small thermometer attached, and can easily regulate the degree of heat; that portion of the pipe nearest the mouth must be covered with a non-conductor, to protect the lips and face. A sheath of asbestos paper or bone can be used, so that it need not touch the heated pipe.

In the use of any agent for obtunding sensitive dentine, dryness is absolutely required. Time is another factor, and this frequently cannot be spared by either the operator or patien.t

Among recently introduced obtunders, he cites Cocaine, Cannabis Indica, and the Oleo-resin of Kora-Kora.

In times gone by, Dr. Harlan experimented with and used the ethereal oils, separately and combined, carbolic acid crystals, both cold and heated, cetolised potash and glycerine, chloride of zinc, sulphate of zinc, camphors, including menthol, hydrate of chloral, ether, alcohol, tincture of aconite root, and other vegetable tinctures, prepared chalk, and other antacids, iodoform, iodide of potassium, glycerine, chloroform, and many other agents, some of which were secret anæsthetics, and hence valueless. Occasionally some one of the above substances would prove of some value, but when most needed they could not be relied upon. The principal difficulty has been that obtunding agents either required too long a period of waiting to obtain results, or they themselves caused pain. The latter is particularly true of those drugs or agents that rapidly abstract water, or are escharotic. For these reasons the majority of the above cannot be relied upon for destroying sensibility in dentine.

Preparatory to the use of an obtunder, the cavity should be opened with a chisel, and the débris washed out with warm water ; the rubber dam should then be adjusted, and if the necks of the teeth are sensitive or the gums tender, they ought to be painted or swabbed with the tincture of cannabis indica slightly warmed. The cavities should then be dried, after which pellets of cotton moistened with alcohol may be introduced and quickly removed, and the obtunder, whatever it may be, should then be placed in the cavity, and allowed to remain while you are operating on some small fissure or other non-sensitive cavity. By so proceeding you inspire the patient with confidence, gain time for the drug to act, and allow the alcohol to evaporate, which is in itself a tolerable obtunder. Dr. Harlan himself uses the fluid extract of cannabis indica.

You will find that the tincture of cannabis indica and the fluid extract are extremely valuable in other directions than that of obtunding dentine, as you can open an abscess almost painlessly by pricking its surface two minutes before introducing the lancet. By soaking a pulp with the fluid extract for a few minutes, you can remove it without pain, provided you have free access to it, so that the brush can be plunged into the canal without unnecessary fumbling around the entrance. You can use the tincture for injections about the root of a tooth, when there are fine deposits on the sides which would cause great pain in removal without its use.

The Oleo-resin of Kora-Kora has been used for obtunding the soft tissue and dentine ; it is disagreeable to use, being greasy and having a bad taste. Dr. Harlan thinks it is less serviceable than Cannabis Indica. Dr. Harlan believes that at present it is possible to prepare and fill cavities in teeth without the destruction of the pulp, which, in many cases before obtunders were properly used, it was impossible to fill with any degree of satisfaction to the operator, and often such operations were of little benefit to the patient.

SETTING TEETH IN ARTIFICIAL SOCKETS.

By Dr. S. S. Southworth, Sacramento, Cal.

Dr. Younger's method of transplantation is described. The patient had lost a left superior first bicuspid, fourteen years ago. The tooth used for implanting had, three weeks before, been extracted from the over-crowded arch of a lady patient. The pulp cavity and canal was filled with Hill's stopping, and the hole in the crown with gold. The apical end of the canals was closed with gold screws, the ends being smoothed and neatly polished. It was kept in one of William's cylinder bottles filled with a liquid composed of two minims of mercuric chloride and one thousand of water. The bottle rested in a pan of warm water kept at a temperature of 100 deg. to 115 deg.

The first operation was gouging out a piece of the gum with sharp chisels, corresponding to the size of the required socket, but a trifle less in diameter. After this, the gum was dissected from the alveolus for a few lines in all directions. A trepan of suitable size was then placed in the engine, and a socket cut about half the length of the tooth. The cutting instrument had a diameter equal to the antero-posterior diameter of the root, and two adjoining cuts were made, one on the lingual and one on the labial side of the socket, having no partition between them, and leaving a socket approximating the shape of the tooth. The débris was syringed out with a cold solution of the mercuric solution. The upper part of the socket was cut out with a smaller trephine and shaped to receive the end of the bifurcated root. The after shaping was done with conical shaped corundum points.

The space between the adjoining cuspid and bicuspid being narrow, the crown of the borrowed tooth was ground off so as to slip into its new position without crowding. Frequent applications were made to see if the tooth fitted snugly, and the tooth always replaced in the warm solution. At the end of an hour and a half, the socket was dried and the tooth placed in position, and pushed home with a crotched stick, as one would do with a pivot operation. The patient experienced no pain or discomfort subsequently.

A patient of Dr. Younger's was shown, for whom a similar operation had been performed over a year ago. The patient was a married lady. A superior second bicuspid had been implanted in an artificial socket. The colour of the bicuspid was perfect.

It is stated that Dr. Younger has nearly one hundred successful cases of this character.

DIE ZAHNTECHNISCHE REFORNM.

A DEAR KISS.

A SHORT time ago, a Berlin dentist was brought before a magistrate for kissing a young lady after a dental operation. The court considered this action such a grave breach of confidence that they punished him with three months' imprisonment. In America or England, a young lady under such circumstances would have received a thousand dollars ; but, should such a course be pursued in Germany, no dentists would be safe from the visits of ladies anxious to obtain dowries at so slight a cost. Any way, the sentence was not undeserved, for it is of the first importance in our profession that the confidence of the public should remain unshaken.

Some years ago, the laws of morality suffered a greater outrage at the hands of a Berlin dentist; and these cases may serve as warning beacons to those engaged in the profession of dentistry.

THE INFLUENCE OF MENTAL WORK ON THE DEVELOPMENT OF THE TEETH.

It has long been a question in the medical world, how far the teeth are affected by mental work, for there is now no doubt that they are so affected.

To determine the cause of this, further investigation should be made.

This subject was first brought forward by two English doctors, who found, by observation, that the destruction of teeth was most rapid amongst those students who did most mental work, whilst it was retarded by a cessation of work.

Is this caused by the phosphorus, intended as nourishing material for the teeth, being consumed by the brain ; or is it that the general health suffers from excessive over-work, thus influencing the formation and development of the teeth? For both views corresponding observations exist. It is well known that certain diseases of the nervous system exercise a hurtful influence on the teeth, and also that phosphor produces a powerful excitation to intellectual activity. Long-continued observations have confirmed that, when excessive mental work or illness weakens the brain, a larger quantity of phosphor is necessary, and this consumption takes place at the cost of the teeth.

The French doctor, Championnière, says that children's teeth should be carefully watched, and their mental work should be limited directly the teeth show signs of decay. Many years ago it was pointed out that the over-straining children in regard to mental work prevented the normal development of the teeth, and was injurious to their general health. It would be advantageous if observations were made in schools on the destruction of the teeth, as well as the eyes, as it is a subject of far greater importance than the ethnographical observations of Professor Virchow as to whether there are more children with light or dark hair in schools.

MONATSSCHRIFT DES VEREIRER DEUTSCHE ZAHKUNSTLER.

A NEW ANTISEPTIC.

Dr. Saudre, Vienna.

A new antiseptic is brought into notice by Herr Doctor Saudré, of Vienna. It is the result of his many experiments which have been crowned with success.

In the Pharmaceutical Hospital of Bolchin, a certain doctor Thorab, drew attention to the antiseptic properties of Helenin, which, if used in the operation room, purified it from all offensive odours, filling it instead with the scent of the Helenin itself. Anyone obliged to remain many hours at a time in an operating room reeking with odours of various gases used in producing anæsthesia, knows how very difficult it is to purify the atmosphere.The ordinary means of deodorising have always been failures, and, for this reason, that perfumes, carbolates, etc., produce an effect only for a short time, and when they are exhausted, the evil remains in *statu quo*.

Dr. Saudré tells us he used Helenin for this purpose, using the half of a 50 per cent. solution Helenin, by means of a spray apparatus. It was so effectual that in ten minutes the room was permeated with the odour of the Helenin and no repetition of the method was necessary until the following day. Dr. Saudré now turned his attention to the antiseptic properties of the Helenin, in which he was assisted by Dr. S. E. Wallis (chemist). The results of their experiments were as follows :—

By an addition of $0,_{003}$ Helenin, freed in $2,_{00}$ Alcohol, it remained in 300 gramme water with beaten-up egg, unchanged for six days, at a temperature of 28° R.

Without the addition, after about twenty hours, a sulphurous smell arose, which disappeared on the addition of $0,_{005}$ Helenin.

Dr. Thorab says that a few drops of Helenin solution kill the organisms in ordinary infusions ; even tubercular bacilli share the same fate. Since his experiments he has used no other antiseptic.

Formerly he used for disinfecting the filling of some root canals pure Helenin ; in other cases a 30 to 50 per cent. solution. Dr. Thorab now uses a 50 per cent. solution ; for disinfecting cavities he uses a 2 to 5 per cent. solution, which he has never found unsuccessful.

The formula of Helenin is $C_{21}\ H_{28}\ O_2$ and is used with the Inula Helenium, and the extractum Helenii in general use in the German Pharmacopœia.

It is questionable whether the Helenin, which is derived from the German plant is equal to that obtained from the Spanish. One thing is certain : that a great future is before Helenin. An antiseptic, which, besides its antiseptic properties, possesses an agreeable odour, has hitherto been a Utopian dream which we now realise in Helenin.

Literary Notices and Selections.

THE PROGRESSIVE AND RETROGRESSIVE PHYSIOLOGICAL METAMORPHOSIS OF THE JAWS AND TEETH.*

By Dr. J. J. R. Patrick, Belleville, Ill.

Gentlemen : If we look over the past history of the science of anatomy, we will find that it is has made marked advance only when connected with the progress of some collateral science. Thus, with regard to the elementary constitution of the earthy salts of the hard portions of our body, our knowledge has been mainly due to the refinement of chemical analysis, and many of the most important principles in physiology have been established by microscopic investigations. By use of the microscope, the physiologist has been taught that the earthy particles of bone and dentine are not irregularly thrown together with the animal bases, but that these particles are built up, with the animal bases as a cement, in the form of tubes or hollow columns in predetermined arrangement, in which there is discovered the same relation to the acquisition of strength and power of resistance in the right direction as in the disposition of the columns, beams, and girders in a finished work of architecture.

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* A paper read before the First District Dental Society, State of New York.

The development of teeth and bones is identical. The hardening salts in both cases are deposited in preformed cells or cavities, organised in a pre-existing mould or matrix of animal matter. But they differ in the direction of the deposits, which in bone is from the centre to the circumference ; in tooth, from the circumference to the centre. The process of calcification in bone is centrifugal ; in tooth, centripetal. Therefore, a tooth, when fully formed, being exposed to the influence of external agents, is subject to decay or injury, but has no inherent power of reparation, and can only increase in size after its formation is completed by the growth of its most highly-organised constituent, the cementum. The cement always closely corresponds in texture with the osseous tissue of the animal to which the tooth belongs, and this is so true in every instance that it serves as a guide in the determination of the nature and affinities of extinct species of animals ; and wherever it occurs of sufficient thickness, as upon the teeth of the horse, sloth, or ruminants, it is also traversed, like bone, by vascular canals. The dentine of the teeth of most mammals, reptiles, and *some* fishes is unvascular ; but the dentine in the teeth of most fishes, some mammals, and a few reptiles is traversed by canals containing blood-vessels, or a projection of the vascular pulp into the dentine, and the tooth-substance thus modified is termed vascular dentine. Now, the vascular and unvascular dentine is often present in the same tooth, as in the teeth of the sloth, the walrus, and the sperm-whale, for the transition from the vascular dentine to true bone, is gradual and close. Where a succession of teeth is required, as in mammals and many fishes, the process of formation is by conversion of, instead of transudation from, a pre-existing pulp, and a successive formation of these pulps necessarily follows. No existing species of fishes or reptiles can be said to have permanent teeth, as their teeth are constantly reproduced, and no extinct species of either class has been found with teeth having divided roots, or manifesting evidence of perpetual growth by a persistent pulp. In teeth where the pulps are persistent, as in the tusks of the elephant, boar, and walrus, and in the incisors of rodents, the formative process is by transudation from, and not by conversion of, the pre-existing pulp. Hence, we find the teeth of all mammals, both deciduous and permanent, where the pulps are not persistent, when in a healthy condition, and having served the purpose for which they were designed, become solid with age, having no internal cavity; and this is produced by conversion of pre-existing pulp into tooth-substance.

To obtain a certain knowledge of the whole structural relations of the human teeth, seems only possible when their development is studied in very differently constructed teeth; for, the higher an animal is placed in the scale of organisation, the more distinct and characteristic are the various organs of the body, and the different tissues which enter into their composition; and this law is well exemplified in the teeth. The great variation in tooth-structure is always adapted to the various conditions of the animal. The teeth determine the character of the skeleton and food; the food determines the structure of the alimentary canal; while the skeleton determines the exact condition of the tissues with which the skeleton is clothed.

The science of morphology teaches that, however modified the bones of animals may be, they all commence as cartilage, and some never ossify, but remain in a cartilaginous condition; and this cartilaginous condition may be regarded as the primitive condition of all bone-tissue. Bone, which performs the function of organs of support and protection, takes the place of cartilage; the lower gives place to the higher and more complete arrangement. It is in this way that the whole skeleton gradually passes from a cartilaginous into an osseous condition. The osseous elements which go to make up the first advance towards a bony cranium, are almost all derived from the dermal structures, which are met with as dermal denticles in the sharks and rays. Some of these bones appear on the outer surface of the cartilaginous cranium, and form the covering bones of the skull; others are found in the mucous membrane of the mouth, or in those cartilaginous arches which aid in forming the boundaries of this cavity; while the true teeth, with their alveoli, are the product of the mucous membrane of the mouth. In the shark family their structure and development are exactly the same as that of the dermal denticles; the matrix of the two is continuous; and, as in many of the same family (salachii), these integumentary scales are distributed over the wall of the buccal cavity, we may conclude that the teeth and scales were originally identical. The difference between the true teeth and scales is clearly due to the adjustment of the same matter to perform new functions. As the cranium owed its shape chiefly to the extension of the contained parts, and as the brain and cerebellum of the fetus are formed long before the skull, it may readily be inferred that the bones of the skull are impressed by the brain, and assume its form. In like manner the pulps of true teeth determine their figure. Before the ossification commences, the pulps acquire the form of the complete teeth, but when the ossification of the body of the teeth has been in part completed, the pulp elongates, and upon the elongation the roots of the teeth are formed. When the vestibule of the alimentary canal is divided into the nasal and buccal cavities, by the formation of a palate, a number of organs were seen in the primitive arrangement are assigned to the buccal cavity, while other organs appear only as later developments. The teeth, tongue, and various glandular organs belong to the former series, but the velum palati is only to be found in the mammals; and the prolongation of the velum, called the uvula, is present only in man and the apes.

When we examine the mechanism of the jaws of animals, we will find that the teeth have been modified in conformity to the direction and manner in which the forces are exerted in mastication; and it is also true that the jaws and the whole skull have been modified by the muscular forces directing these movements. The elevation of the lower upon the stationary upper jaw is a very energetic movement, and is performed by the temporal, masseter, and internal pterygoid muscles. Now, all these muscles are attached to the lower jaw between the fulcrum or condyle of the jaw and the weight to be moved, or fore-part of the jaw. They therefore constitute levers of the third kind; and hence, though acting promptly, are placed at comparative disadvantage for exerting their full force. The lateral movements of the lower jaw are effected by the alternate contraction of the external pterygoids; they are feeble in man, but attain their highest state of development in the ruminants. The forward and backward movements, also feeble in man, but very powerful in the rodents, are due—the forward to the external pterygoids, the backward to the deep portion of the masseter, the posterior fibres of the temporal, and the internal pterygoids.

The buccinator, which forms a considerable proportion of the thickness of the cheek—and which is an important agent in preventing the accumulation of food between the teeth and the cheek, the occurrence of which is so troublesome in some cases of paralysis—becomes a power in the movement of the jaws in some animals. In estimating the muscular power necessary to grind or cut the food in mastication, the kind of food, and the form and character of the teeth, are important factors. The rapidity with which the carnivora depress and elevate the jaws in seizing a living prey is accomplished by the enormously developed temporal and digastric muscles; and, owing to the great development of the temporal muscle, the orbits in these animals are not separated from the temporal fossa in the skeleton, and their teeth, being acute wedges, have little resistance to overcome. In the ruminants or herbivorous animals, where the power is used exclusively to grind the food, the masseters and external pterygoids are greatly developed, and in the rodents the temporal muscle is a mere thread, but the masseters, the internal and external pterygoids, are very large. The inferior jaw in the rodents is articulated by a longitudinal condyle, in such a manner as to allow of no horizontal motion, except from back to front, and *vice versa*, as is requisite for the action of gnawing. In the true carnivora, owing to the rising edges of the glenoid fossa and transverse position of the condyles, all forward, backward, and lateral motion of the jaw is precluded, and the jaws in these animals open and shut like a hinge. The ramus and the condyles being but a little above the line of the back teeth, allow the jaws to fall low enough to clear the points of the cuspids, and thus bring these trenchant teeth into action. In all animals presenting this conformation of jaw the tempora muscle is highly developed, giving great speed, and the loss of power is compensated by the conformation of the teeth; and this law of mechanical force is present in the form and arrangement of the dental series of all animals—the further the teeth are from the power, the more they assume the form of a wedge. The law is beautifully illustrated in the dental series of man, who is endowed with an uninterrupted series, representing in their forms and characters the teeth of all other mammals, and the different movements of the jaw, possessed in part only by other animals, are all reproduced, in a moderate degree, in the human subject. In short, the motion of the jaws corresponds to the character of the teeth implanted in them, and the condyles and muscular arrangements are modified accordingly. The mouth in all animals when at rest is closed, the teeth resting on each other with a gentle pressure ; but, as rest is simply a gradual change of position, the teeth are alternately in contact and slightly separated. The muscles which close the jaws being much more powerful than those which open them, there would be no equality of muscular force to maintain the lower jaw in a quiet condition, were it not that the muscles which open the jaw are attached in such a way to the lower jaw as to form levers of the second kind ; whereas, the muscles which close the jaw, while more powerful, are attached so as to form levers of the third kind, and thus the opening and closing forces are equally balanced when the jaw is at rest. It seems to be impossible for the muscles which open and close the jaw to contract at the same moment. They, therefore, cannot be considered in the light of opposing forces, as they act in unison, but in opposite directions, depressing and elevating the jaw alternately. From these considerations it would appear that the teeth of man cannot be thoroughly understood without including the growth and development of the same kind of organs formed for similar functions under different circumstances in other organisations.

In describing the superior and inferior set of human teeth, deciduous and permanent, I will use the terminology employed by the general anatomist, when he draws an imaginary line through the body, dividing it into two lateral halves. This line he calls the internal surface or margin, right or left ; all that is distant from this line, right or left, is the external margin or surface. All that which is directed in a line from the brow to the great toe is the anterior ; and all that which is directed in a line from the back of the head to the heel is the posterior. So, all that is directed from the soles of the feet toward the crown of the head is the superior, and all that is directed from the crown of the head to the soles of the feet is the inferior, surface or margin.*

This terminology will not conflict with the vocabulary now employed in describing the different surfaces and margins of the teeth, as the words mesial, distal, labial, buccal, lingual, and palatal are sufficiently clear for ordinary purposes ; but as the teeth can be fully described by the terms in general use by anatomists, I prefer to use these terms, since they have the least tendency to confusion.

Now, inasmuch as the teeth are arranged in the maxillaries of the human subject in a parabolic curve, and are uninterrupted by any vacant space—as in most other animals—and as the cuspids are situated on that part where the alveolar curve retreats posteriorly and almost forms an angle, it would not be strictly true to call the margins of these teeth internal and external, and their surfaces anterior and posterior. Therefore, to prevent error, we will name the margins of these teeth the anterior and posterior, and their surfaces the external and internal, and thus include their surfaces and margins with the bicuspids and molars. On the contrary, the general rule will be observed in describing the incisors ; their margins are internal and external, and their surfaces are anterior and posterior, and this rule will apply to the inferior as well as the superior set.

(*To be continued.*)

Dental News.

PROSECUTIONS UNDER DENTISTS' ACT.

Smith v. Friederik.

Stratford Petty Sessions, Wednesday, August 18th, 1886.

(Before Nathaniel Powell, Esq., Chairman, and W. W. Glenny, Esq.

The Clerk: The information is this :—" That A. Friederik, of No. 1, East Avenue, Oxford Road, Walthamstow, in the county of Essex, did unlawfully within the space of six calendar months last past, to wit, in the months of July and August, 1886, at 5, East Avenue, Oxford Road, aforesaid, not being registered under the Dentists' Act, 1878, take and use the D.D.S., or some other name, title, addition, or description, implying that he was registered under the said Act, or that he was a person specially qualified to practise dentistry, contrary to the form of the said Act."

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* In a recent nomenclature given to the profession, no less than fifty-three surfaces are enumerated, and not a single margin. As there are no tangible objects in the whole universe that have surfaces but what also have margins (with the exception of spheroids), I see no reason for omitting margins in a description of the human teeth.

The defence contended that this information implied two offences; the prosecution, however, upheld that it was really immaterial whether one or many titles were employed, and the case was proceeded with.

Mr. CRAWLEY-BOEVEY, for the prosecution, said: Taking and using the letters "D.D.S." and the words "Doctor of Dental Surgery." I have read the section under which the defendant is charged to your worships—the section of the Dentists' Act, and I will refer the court to section 26 of the Medical Act of 1886, 49 and 50 Vict., ch. 48. The 1st clause of section 26 provides: "It is hereby declared that the words 'title, addition, or description,' where used in the Dentists' Act of 1878, include any title, addition to a name. designation, or description, whether expressed in words or by letters, or partly in one way and partly in the other." That section was expressly passed to meet a case such as the present, and to make it perfectly clear that the mere use of letters alone would be quite sufficient to render a person liable under the terms of section 3 of the Dentists' Act. The facts of the case, are, shortly, these: Mr. Friederik, the defendant, has been practising as a dentist for some years past in East Avenue, Oxford Road, Walthamstow, keeping the usual establishment, and having a brass plate upon the door with the words "Dr. Friederik, D.D.S., U.S. America," and a case of artificial teeth in front of the premises. I will refer your worships to page 24 of this copy of the Dentists' Register, which I will hand to the Court. It is a copy which purports to be printed and published in pursuance of the Dentists' Act. Your Worships will find at page 24, a table of registerable qualifications under the Dentists' Act, with the abbreviations used to denote them; and you will see there that the letters "D.D.S." are used as a designation of the diploma "Doctor of Dental Surgery," which is granted by the American College of Michigan. That is a diploma recognised by the General Medical Council, as provided by section 10 of the Dentists' Act. Your Worships will see

"D.D.S. Doctor of Dental Surgery, Michigan." Section 9 of the Dentists' Act provides for the registration of a foreign dentist with a recognised certificate, and section 10 provides that "the certificate granted in a British possession or in a foreign country, which is to be deemed such a recognised certificate as is required for the purposes of this Act, shall be such certificate, diploma, &c., as may be recognised for the time being by the General Council, as entitling the holder thereof to practise dentistry or dental surgery, in such possession or country, and as furnishing sufficient guarantee of the possession of the requisite knowledge and skill for the efficient practice of dentistry or dental surgery." If your Worships will refer to page 226 of the Register, you will find that there is one foreign dentist registered as the holder of that diploma "Doctor of Dental Surgery," and only one. That Register is made *prima facie* evidence, under section 29 of the Dentists' Act, and I should submit that those entries show the meaning of the letters "D.D.S." which the defendant has used. They show that those letters are the designation of the diploma "Doctor of Dental Surgery," granted by a recognised foreign university; and it perfectly clear that the defendant, using those letters, has made use of a title within the meaning of section 3, a title or description implying that he is a person specially qualified to practise dentistry, inasmuch as the holder of that diploma is registered. Now, the defendant himself is not registered under the Dentists' Act. Your Worships will see that his name does not appear upon the list either of dentists of the United Kingdom, or of Foreign Dentists in that document, which is the register of dentists for the current year published under the Dentists' Act. If any doubt should arise in the minds of your Worships with reference to the meaning of these letters "D.D.S." it will be removed by a card which the defendant has published, in which he distinctly describes himself as "Doctor of Dental Surgery." I shall put the card in. It is his own card, and the fact that the title appears on the Register shows very clearly what is the meaning of the letters. It may be that the defendant holds a diploma granted by some American university, He uses the letters "U.S." and "America," and it is quite possible he may hold some diploma; but even supposing that he does so, and further assuming that such diploma is a recognised diploma within the meaning of section 10 of the Act, it will not protect him from liability for the offence with which he is now charged, because he is not now on the Register. In fact, there are only two points to which the attention of the Court should be directed: first, has the defendant made use of a title or addition, implying either that he is registered under the Act, or specially qualified to practice dentistry; and, secondly, if so, is he on the Register? The fact that no one is entitled to make use of a description implying that he is a person specially qualified unless he is registered, would show that anyone using such a description holds himself out as being registered. No one who is not registered has a right to describe himself as "Doctor of Dental Surgery," or to describe himself under any other title, implying that he is specially qualified unless he is registered, so that, your worships will see, the one offence includes the other. It may be that the defendant will contend that, being a foreigner, he was in ignorance of the provisions of the Act, and may possibly throw himself upon the consideration of the Court on that ground; but with reference to that, I would mention that so long ago as the 19th of January last, Mr. Frederick Canton, who is the Hon. Secretary of the British Dental Association, wrote him a letter calling his attention to the fact that in using these letters he was infringing the provisions of the Dentists' Act.

The defence here urged that Friederik had written to the Secretary of the British Dental Association, asking how he (Friederik) could put himself straight with the law, but a letter was put in from Mr. Canton of earlier date, with Friederik's reply, as follows:—

> DEAR SIR,—In reply to yours of the 19th inst., I beg to inform you that as I am a foreigner I am not well acquainted with the English laws, and therefore any infringement against the Dentists' Act I have been guilty of has been made in ignorance. Permit me to mention that I do not call myself dentist, or in any way represent myself as a registered dental surgeon. If you would be so kind as to correct me in any contravention of the said Act, you may rely on my acting according to yonr advice.
>
> Yours faithfully,
>
> A. FRIEDERIK.

To that letter Mr. Canton replied he was not in a position to give the defendant advice.

Continuing, the Prosecution submitted that the defendant, although a foreigner, could not plead ignorance, as his attention was drawn some eight months ago to the fact that he was infringing the Act. The last clause of section 4 of the Dentists' Act has been repealed by section 26 of the Medical Act, 1886, which allows a private person to institute proceedings. Now, as I understand, my friend contends that before the Medical Act came into force, the defendant would not have been liable for the use of these letters. I submit that that is not so. It would still have been open to the prosecution to prove that the letters "D.D.S," did constitute an "addition or description" within the meaning of section 3. Under the original Act, section 3, we should have been in a position to prove, just as much as we are now, that the letters "D.D.S." constituted a title or addition. It would have been obligatory upon us, just as it is now, to show what they mean ; but we can show, as we do now, that they do constitute "a title or addition." Section 26 of the Medical Act does not amplify or explain section 3 of the Dentists' Act, It merely says, in express terms, that letters shall constitute "an addition." It places the matter beyond all doubt. In point of fact, there was very little doubt before the Medical Act came into force ; and, as a matter of fact, prosecutions have been instituted, within the last year or two, against persons in the same position as that which the defendant occupies, for using letters simply as "an addition or title." I may mention that though Mr. Thomas Smith is the prosecutor in this case, prosecuting as a common informer, the proceedings have really been taken at the instance of the British Dental Association, which is an Association framed on the lines of the British Medical Association. I mention that in anticipation of a suggestion which is frequently made in cases of this kind, namely, that the prosecution is the result of professional jealousy on the part of some local practitioner. The fact that the British Dental Association are prosecutors, removes all ground for that suggestion. There is no desire on the part of those by whom I am instructed in this case, to press for a heavy penalty or anything of that sort. These proceedings are taken in the interest of the public. It is important that the very large class of persons who practise dentistry under cover of some certificate or diploma obtained from some foreign College and not recognised by the Council, should understand that they cannot make use of such certificate or diploma in this country, unless they are on the Register of Dentists. In considering the question in this case, your worships will have regard to the general scope and intention of the Dentists' Act, which clearly was to protect the public against unqualified practitioners. The Act imposes certain qualifications which must be held by people who seek to have their names placed on the Register, and it gives them certain privileges. Section 5 allows persons who are registered under the Act to practise dentistry and dental surgery, and provides that persons not registered shall not practise. That is the effect and intention of the Act, and it seeks to carry out that intention by preventing persons, whether they possess diplomas or not, from implying that they are specially qualified, unless they are on the Register. I will now call the prosecutor, Mr. Thomas Smith, for the purpose of proving that the defendant has used the letters "D.D.S." and the words "Doctor of Dental Surgery."

It was proved that defendant's premises, No.5, East Avenue, Orford Road, Walthamstow, bore the inscription "Dr. Friederik, D.D.S., U.S., America." A lamp was also affixed over the door, with the inscription upon it, "Artificial Teeth, extractions, stoppings, &c." as well as a show-case attached to the wooden railings in front of the house, with specimens of artificial teeth in it, also two or three pieces of paper or card attached to the back of the case, upon one of which were the words, "Dr. Friederik, D.D.S., U.S. America, Dental Artist." It was also stated that Mr. Friederik employed a card on which was printed, "Mr. A. Friederik, D.D.S., U.S., Doctor of Dental Surgery and Specialist of Artificial Teeth."

Mr. Sharman, speaking for the defence, said: The circumstances are simply these:—The defendant came to this country not "years ago," as my friend says, but about twelve months ago. He lived in London, and was invited down to Walthamstow. He is a foreigner who can speak very little English; but he studied and passed his degree at a foreign University, enabling him to practise dental surgery in all its branches abroad. Through his lack of English, he has been unable to submit himself to an examination in English; but he is quite prepared, at any moment, to pass the English examination, if it were conducted in the language with which he is sufficiently familiar. Almost immediately on his commencing business, he communicated with the Secretary of the British Dental Association, saying that he was at that time practising dentistry, and that if he was in any way infringing the Act he should be glad if some one would tell him, a foreigner, what he ought to do, and he would at once comply with the law. Now, from that date in January until the present moment, he has never had the slightest intimation that he was doing wrong until the summons is served upon him. I venture to think (and I submit it with all confidence) that this prosecution could not have taken place until they had the amending Act, because I am quite sure that without the section in the amending Act defining and explaining the offence, your worships would never have convicted under this present information. If, as my friend says, the original Act was sufficient to meet the case, I venture to think it was a great pity that this body of highly influential gentlemen should have gone to overburdened Parliament, and have troubled them to pass an amending Act for the express purpose of hitting one such as the defendant. They have plenty to do at Westminster without passing Acts of Parliament which are works of supererogation. For the defendant, I can only say that he has not the slightest desire to infringe the Act of Parliament in any way whatever. Had an intimation been given him by the Association in reply to his letter of January, that he was doing so, he would have at once registered himself. If your Worships are of opinion that he has infringed the Act, through me he has to express his great regret, as a person not understanding our language and our laws, that he has infringed the Act; and he will submit himself cheerfully to any course you may think fit to adopt, and also pass an examination at the earliest possible moment, so as to be registered in compliance with the Act. The defendant is a fully-qualified man, though he is not registered.

Mr. Crawley-Boevey (for the prosecution): That is not proved. There is no evidence before the court to show that the defendant is fully qualified, or that he has any qualifications whatever.

Mr. Sharman: I was saying this, that the defendant is fully qualified by a foreign diploma to practise dentistry. It is not a case of an unskilful person practising a profession which he does not understand; it is merely that a skilful person unacquainted with our laws has published, without having his title registered and put upon the Register. Under these circumstances, I would ask your worships either to dismiss the case or to adopt the course which was pursued only last week on a similar prosecution before another bench, and order the defendant to pay the costs and to come up for judgement when called upon. My friend said he did not wish to press the case, but only to vindicate the law. Therefore, on behalf of the defendant, I would ask your worships to adopt that course, and I will now leave the matter in your hands.

The Chairman gave the judgment that as the defendant was not registered, he was therefore liable to a penalty. He would be fined twenty shillings, and the costs of the court.

HOSPITAL REPORTS.

WORK done at the Victoria Dental Hospital of Manchester, during the month of September, 1886:—

Number of Patients attended		883
Extractions	Children under 14 Adults	821
	Under Nitrous Oxide	55
	Under Cocaine	20
Gold Stoppings		25
Other Stoppings		60
Miscellaneous		223
Total		1,204

HENRY L. KNOOP,
Hon. Secretary.

MONTHLY STATEMENT of operations performed at the London Dental Hospital, Leicester Square, from September 1st to 31st, 1886:—

Number of Patients attended		2370
Extractions	Children under 14	410
	Adults	1202
	Under Nitrous Oxide	620
Gold Stoppings		175
Other Stoppings		599
Advice and Scaling		184
Irregularities of the Teeth		46
Miscellaneous and Dressings		356
Total		3592

CHAS. F. RILOT, L.D.S.,
House Surgeon.

MONTHLY STATEMENT of operations performed at the Birmingham Dental Hospital, for September, 1886:—

Males	515
Females	557
Total	1072
Extractions	986
Gold Stoppings	1
Other Stoppings	73
Advice and Temporary Fillings	83
Miscellaneous	76
Irregularities of the Teeth	0
Anæsthetics	19

W. PALETHORPE, L.D.S.,
House Surgeon

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ON A SIMPLE METHOD OF PHOTOGRAPHING BIOLOGICAL SUBJECTS.*

By T. Charters White, M.R.C.S., L.D.S., President of the Odontological Society of Great Britain.

After some general remarks, Mr. Charters White said photo-micrography, to be successful, must be approached by easy stages ; it is of very little use to plunge *in medias res* by employing high power objectives before the comparatively simple routine of taking a photograph with a low power has been mastered ; and, simple as this routine is, there are difficulties which present themselves at every turn, but by careful attention and experience they can be overcome, and the operator rewarded with a satisfactory result.

In photo-micrography we have the converse of micro-photography, which is applied to the making of such small photographs as to require the aid of the microscope to render them visible, while photo-micrography is applied to the pourtrayal of microscopic specimens by photographic enlargement. My reason for mentioning this distinction is to correct a tendency very generally prevalent, that these terms are mutually convertible, and may be used with indifference.

In all the processes described by various authors, the microscope has been employed in conjunction with the camera, and beautiful results have been attained thereby ; but, while fully admitting this, I have never felt satisfied with the constricted field of view produced by the microscope tube ; therefore, in the method I wish to introduce now, I discard the use of the microscope entirely ; the advantages I claim for this being—first, the field of view is only limited by the size of the sensitive plate employed, and a great range of amplification is obtained by varying the distance between the objective employed and the sensitive plate, and an amplification suitable to the subject can be easily selected. A second advantage derivable from my arrangement is in the ability to see your image, and arrange it according to the part you desire to photograph; this can be done on the ordinary ground focusing glass of the camera, as you are aware, but when the image is thrown on to a white ground—as it is in my apparatus—it is more easy to select any particular portion, and to focus it roughly. This method is only suitable for photographing transparent objects, but, as it is more immediately designed for the delineation of histological subjects, nothing can exceed its adaptability to do this in comfort and ease.

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* A portion of a paper read at the Annual General Meeting of the British Dental Association, August, 1886.

Before proceeding further, it may make my remarks more readily understood if I briefly describe the photographic arrangement I employ. Imagine an oblong, lidless box, laid on its side, and securely screwed to one end of a base board, two inches in thickness, and two and a half feet in length; the upper central part of this base board, about one inch in thickness, is made to slide in a dovetailed groove—the end of this sliding part carries the holders for the plates employed—this holder being an ordinary printing frame, in which photographic negatives are printed from. I vary the size of the holder according to the amplification I require, and by means of this sliding holder can diminish, or greatly extend the magnification, as may be desired. The upper side of this box has an oblong opening cut in it, over which a tin chimney is fixed, thus allowing my lamp to approach or recede from the object stage, as may be desirable. Another opening is made in that side of the box which faces the plate holder, and central with it; this opening is closed by a movable brass plate, having an adaptor with the standard microscopical screw soldered into it; this permits any objective with the Society's screw-gauge being employed. Below this plate, a support carrying the movable stage is fixed to the side of the box, this stage being moved backwards or forwards by a long micrometer screw; the subject to be photographed is made to approach or recede from the objective till a sharp image is thrown on the screen; the best focusing screen is made by covering an old glass plate of any of the standard sizes intended to be employed, by gumming on a sheet of the smoothest white paper; this enables the operator to arrange the object according to his judgment, and permits of a certain amount of rough focusing. The finest focusing must be arrived at by other means; another plate of plain glass put into the holder, having *fine* lines drawn a short interval apart, with a writing diamond on the surface of it, which faces the objective, is looked at from the back through an ordinary eye-piece or a photographic focusing-glass, and when the details of the objects are seen sharply at the same time as the fine lines, a sharply defined image will be thrown on the sensitive gelatine plate, which it is intended shall occupy in the holder the place now occupied by the plain glass.

The light is derived from a microscopical lamp, burning the purest paraffin oil, in which is dissolved a lump of camphor of the size of a walnut, to the ordinary reservoirful; this whitens the flame, and renders it more actinic; a plano-convex lens, with the convex side towards the flame, serves to concentrate the light on the object. A curtain of black velvet falls over the front of this arrangement, shutting all light in, and a shutter cuts off the rays coming through the objective till all is ready for them to fall on the sensitive plate during the proper time of exposure. Now, this is in brief a short description of the apparatus I employ, and it next demands a few directions relative to the *modus operandi* practised.

The lamp, having been lighted and placed inside the box, is allowed to burn some short time before commencing work, that the wood and brass work may be warmed up; for if this is not done, the expansion of these, after you have focused your object, will result in a blurred picture. Your microscopical slide may next be placed in position, and its projected image arranged on the white paper surface of the focusing screen. You will soon learn to see by the character of this image whether it will require a long or a short exposure, whether it reveals much detail or is marked by its entire absence, or whether its colour favours photography or not; if the object or its image possesses detail of a fairly well-marked character, and the object is not too thick, you may calculate upon getting a successful result if you give the *correct* exposure; and now you are brought face to face with the first of the difficulties.

Having selected your objective and focused your image, cut off the rays of light from the screen, and shut in every vestige of light. Now, being in perfect darkness, light your non-actinic lamp; these are sold of various patterns, but may not be actinically safe, as I have found to my cost upon several occasions. That I use is a paraffin lamp, with all light blocked out through the reservoir, an argand wick, and a tubular chimney, well coated inside and out with Thomas's ruby varnish; this will afford abundance of safe light at eighteen inches distance. By this light take your sensitive plate from its box and put it into the focusing frame, when its gelatine surface ought to be in exact register with the fine diamond markings, by which you get the true focus; then open your objective, and let the image of your preparation fall on the gelatine plate for the number of seconds or minutes given in Mr. Walmsley's table; after which, shut off the light again, and proceed to develope. I need not say much on this subject, because it has been fully treated in all the elementary books on photography. Some operators prefer the ferrous oxalate developer, while others adopt that which is known as the alkaline pyrogallic acid. I have used both, and, although I have got very good negatives with the pyrogallic acid, I prefer the ferrous oxalate, because it does not stain the fingers, which is an important feature in our profession. As some of those present may like the simplicity as well as the cleanliness of this developer, and as this paper may be perused by those to whom the subject may be entirely new, I might trespass on the time of this meeting sufficiently far, as to give the formula for making it. Having made two *saturated* solutions, one of neutral oxalate of potash and another of sulphate of iron, add them together in the proportion of one part of iron to three parts of oxalate of potash, *taking care always to add the iron to the potash*; it makes a dark sherry-coloured mixture; if it is feared that the plate has been slightly over-exposed, add a few drops of a 10 per cent. solution of bromide of potassium, which, acting as a restrainer, keeps back the too-rapid development of the image. Keep up the development till the general ground of the plate does not transmit any light, and all detail is out in the image; then give the plate a good rinse in a pail of water and place it in the fixing bath, the solution in which is made by dissolving four ounces of hyposulphite of soda in a pint of water; let the plate remain in this some minutes after the bromide of silver, which has not been acted upon by the light, and which remains yellow, is dissolved out, when it may be removed and washed copiously in running water, dried spontaneously and varnished, when it may be printed from.

When powers higher than one-fifth of an inch focus are used, it might be desirable to have a more powerful light than that afforded by the paraffin and camphor, but as a rule that will be found sufficient for such powers as we are most likely to employ, especially if the edge of the wick be presented towards the object. A further use to which this apparatus may be put is as a projection microscope. A screen of tracing-paper taking the place of the focusing screen, and of any convenient dimensions, may be made to receive the image in a darkened room, when several persons can examine it with as great facility as if looking at it through the microscope. Another use may be found for it; a plane mirror silvered on its face and fixed at an angle of 45 degs., with the course of the rays as they pass through the objective, are thrown down on a sheet of drawing-paper, and thus the image may be traced, and even coloured in its natural colours.

BRUSSELS.—DENTAL EDUCATION IN BELGIUM.

From an Occasional Correspondent.

The committee appointed by the Académie Royale de Médecine to inquire into the subject of dental teaching, and the changes required in the laws relating to the practice of dentistry in this country, presented their report at the June meeting of the above body, and I have just heard that their recommendations were adopted a few days ago, after a lengthy discussion.

As I believe I mentioned in my last letter to you, the committee consisted of Drs. Soupart de Roubain and Deneffe, who first brought the matter before the notice of the Académie.

The report is especially of interest as showing the present status of dentistry in Belgium, and the relation which, in the opinion of the highest constituted medical body in the country, it should bear to the general medical profession. As such, a short summary may not be out of place in your esteemed journal.

The committee state that, immediately after their appointment, they placed themselves in communication with the Société Odontologique de Belgique, from whom they received a long memoir on the subject, which forms the basis of their report, and the substance of which they accepted, though they found themselves obliged to dissent from some of the details.

The first reform which is imperatively called for, is the foundation of a theoretical and practical teaching of the art of dentistry. At the present time, young men who wish to practise dentistry are obliged to go to some foreign country to learn their art, unless they content themselves with what they can pick up by becoming assistants to a more or less qualified local dentist. The Société Odontologique proposes the establishing in Brussels of a dental college for the whole of Belgium ; but the committee, while fully acknowledging that the pathological material is far more plentiful in the capital than in any other Belgian city, look upon the proposal as contrary to all the traditions of the country in the matter of education. The endeavours of successive Governments have been directed towards the diffusion of every degree of education, and not towards its centralisation in any one town, and they have never allowed themselves to be influenced in any way by questions of economy. The emulation and competition which exist between the Government and free universities would soon lead to the foundation of similar schools in Brussels and Louvain.

There are four universities in Belgium, two of which—those of Ghent and Liège—are under the direct control of the Government. The two others are quite free ; that of Brussels is carried on on scientific, or rather, anti-theological, principles ; that of Louvain—the oldest in the country—is the theological or Catholic university.

If the dental art is to be taught in Brussels in a special school, *i.e.*, altogether free, the committee see no reason why there should not, before long, be calls for a school of otology or a school of gynæcology. It is true that in England, in the United States, and in France, dentistry is taught in special schools, but they are all private foundations. The dental school of Geneva is the only instance of a special institution founded by any Government. In Germany, Austria, Russia, and Holland, odontology is either taught, or about to be taught at the universities. Needless to say, of course, that the holders of these chairs are specialists.

The next point considered by the committee was : Should the dentist be a medical man (a fully qualified medical practitioner) ? By the word medical man is meant one who has received the triple diploma of Doctor of Medicine, Surgery, and Midwifery. In Belgium, like in many other countries, these diplomas always go together.

It is obvious that no person in his sober senses would ever dream of calling in a dentist, either to treat a case of angina pectoris, or pleurisy ; to set a broken limb, or to remove an ovarian tumour ; to diagnose a case of pregnancy, or to apply a cephalotribe ! The practice of medicine is quite as separate from that of dentistry, as are general surgery and midwifery. If he is neither to practise medicine, surgery, nor midwifery, why make a dentist lose so much valuable time in becoming a physician, a surgeon, and an accoucheur?

In specialising, *i.e.*, restricting the studies of dentists, Belgium would only be following the lead of nations who have taken up this question before her and preceded her in organising the teaching of odontology. Austria and Hungary are the only countries where there are no dentists, but medical men alone are allowed to practise dentistry.*

In Germany, the practice of dentistry is regulated by the law of 1852, which prescribes a special course of study and special examinations for dentists.

Holland affords an example of the mistaken policy of trying to make dentists take the diplomas of doctor of medicine surgery and midwifery. In 1867 dentistry was put on a par with the other medico-chirurgical specialities, and was included in the general practice of medicine, to exercise which it was necessary to hold full medical diplomas. The result was, that from 1867 to 1876, only two medical men became dentists. . . In 1876 the law was amended, and a special course of study and special examinations were required of dentists.

In Russia, the Government grants special diplomas to dentists after a special course of study and special examinations. The same holds good for Switzerland.

In France, the practice of dentistry is still open to everyone, but, thanks to the initiative of the dentists in Paris, a special school of dentistry has been instituted, which is already very well attended.

In Great Britain and the United States, dentists are required to have undergone special courses of study. It is to the dentists of these two countries that we owe all the recent advances in the art of dentistry, and their system of dental education is the model which all the European states have followed.

Marking that the studies of a dentist be restricted to his speciality, the committee state that they would not confine them to the narrow circle of the dental system. The first point they would insist upon is a preliminary examination or the production of a certificate showing that the candidate had received a sufficient preparatory education.

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* A few months back, the B.J.D.S. published a very interesting paper on the status of dentists in Austria and Hungary.

After reviewing the syllabus of the course of studies required of dentists, more especially in England and in the United States, the committee propose the following as the course of study they would like to see adopted in Belgium.

The studies should extend over a period of four years.

1st Year (*Special candidature in Natural Science*).—This year should be given up to the study of Natural Sciences, on a restricted programme. Physics, chemistry, elements of botany and geology.

2nd Year (*Special candidature in Medicine*).—Anatomy, both human and comparative, more especially of the mouth histology, physiology, pharmaco gnostics.

The student will have to pass an examination at the end of each year. He must pass the first examination before being allowed to follow the second year's course, and the second examination before attending to professional, or third year's classes. He will also be required during these two years to attend the practical classes of dental mechanics and prothesis in special laboratory.

3rd and 4th Year (*Professional Studies*). *Theoretical Classes.*—Anatomy, physiology, dental histology, both human and comparative. Elements of general pathology. Special pathology of the affections of the dental system.

Medicine and surgery in their relations with odontology. General elements of therapeutics, and pharmaco-dynamics, (specially relating to dental matters). Anæsthesia and hygiene of the mouth, chemistry and dental metallurgy.

Practical Studies. Clinical lectures, operations, administion of anæsthetics, extractions of teeth, filling teeth, gold, cement and metallic stoppings, operations on the palate and maxillæ, treatment of dental anomalies, regulations, grafting prothesis, pivoted teeth, obturators and appliances for the palate. A theoretical examination will be held at the close of the third year on the matters taught during that year. The diploma of this examination carries with it the title of *candidat-dentiste*.

The last examination is strictly confined to practical tests. The diploma granted at this examination is that of dental surgeon.

To be admitted to this examination, the student will have to show that he holds the diploma of *candidat-dentiste* ; that he has followed assiduously and with success during a period of four years, practical manipulations in the laboratory of mechanical dentistry ; that he has attended during two years the dental clinical lectures; that he has been a pupil for two years of a qualified dentist, or that he has attended the dental clinic during that period.

The report of the committee thus accepted by the Académie de Médicine must now go to the Government, who will, no doubt, before long, bring in a bill embodying these recommendations.

A HARMLESS SUGGESTION.

By Arthur F. Hare, D.D.S.

Why not establish a dental circulating library? Head centre in London, branch offices, if occasion required, throughout the provinces. To comprise *all* works on dentistry.

1. Standard text-books, and other publications used and recommended by the professors and examiners of our dental hospitals and colleges.
2. Ancient and modern works. Home and foreign.
3. Complete catalogue (every dentist to be supplied with a full copy on application) at a moderate price. Catalogue to be revised and corrected periodically, according as additions to or subtractions from the list necessitate.
4. Periodicals, journals, etc., etc., to be found on the shelves.
5. Amount of subscription (annual) to be regulated according to circumstances.
6. Penalty of fine to be imposed in cases of loss, or mutilation of books, etc.

Formulate a code of rules and regulations. Books to be forwarded by post to subscribers, should they so desire (not to be detained by them, unless under exceptional circumstances, beyond a specified time), etc. A crowd of expedient regulations might be framed, borrowed or adopted; the institution worked on the most elaborate, or simple system, and the whole idea altered, modified and improved by the united intelligence of the 'practical' members forming the committee of management.

Among some of its real uses and objects might be enumerated the following:—

1. To encourage and provide for the diffusion of a more *accurate* and *extensive* knowledge of general dental history, literature, science and art (among the fraternity.)

2. As an invaluable aid to students, magazine writers, and general practitioners (of dentistry).

3. Its charitable object. For the proceeds might be applied to the relief of "deserving cases" of genuine distress; and would, no doubt, on this ground "supply a long-felt want," in affording an additional outlet for the exercise of that spirit of inexhaustible and exuberant benevolence, so common—not to say rampant—among dentists and others of this nineteenth century, who are prone to act up to the current notion, and to believe that the terms "charity" and "filthy lucre" are interchangeable expressions conveying the same idea.

Should this suggestion be of any practical value, there would of course be little difficulty in putting it into execution, providing its cause were espoused by that community which, in my humble opinion, would be the best qualified to undertake the task—namely, the members of the B. D. A.

In conclusion, (though *much* more might be said on the subject), I may add that I know of no public library affording the above facilities, nor am I aware whether the idea has ever been broached before.

THE PROGRESSIVE AND RETROGRESSIVE PHYSIOLOGICAL METAMORPHOSIS OF THE JAWS AND TEETH.*

(Continued.)

By Dr. J. J. R. Patrick, Belleville, Ill.

In relation to their situation, the teeth are classsified into superior and inferior teeth; in relation to their duration, into deciduous and permanent teeth; and in regard to their kind and form, into cutting or incisors, cuspids, bicuspids, and molars. Those twenty teeth found in the maxillaries of a child between the ages of three and six years are called deciduous. Previous to three years they are not all present, and later than six years they begin to drop out, by a physiological process of exuviation, and to be replaced by new permanent teeth. The expression "teeth of the first set," meaning the deciduous teeth, is likely to lead to error, for the reason that the six upper and six lower permanent molars are teeth of the first set, which are never replaced by others. In a human being of twenty-five years of age, the permanent set of teeth—thirty-two in number—is generally complete. Twenty are permanent succedaneous teeth, and take the place of the deciduous teeth that are lost; the other twelve molars, which are to the posterior, have had no predecessors, and never mutate. According to species and form in the superior and inferior maxillaries, the four anterior teeth are cutting or incisor teeth; the next two pointed teeth are cuspid; the next four are premolars, which are bicuspid; and the last three on each side of each jaw are grinders or molars. These four species of teeth are generally recognised by naturalists and anatomists as belonging to man as well as most other mammals. Now, it is well enough to observe that the eight bicuspid teeth which belong to the permanent set in man are not preceded by teeth of the same character or form, nor do they occupy as much space in any direction in the form of their crowns as their predecessors; they, therefore, deserve to be classed as a definite and separate species from the true molars, and they are accordingly so classified. Furthermore, the deciduous molars which precede the bicuspids occupy a different position in their relation to the power that moves the lower jaw upon the upper. Had they been succeeded by teeth with large, square crowns, with broad masticatory surfaces, they would have been comparatively useless after the development of the permanent molars, and consequent progressive growth of the jaws, from the posterior forwards. From the time of the appearance of the permanent molars, the deciduous molars are gradually moved forward, increasing the distance from the attachment of the masseter muscle, until finally, becoming comparatively useless for trituration, other teeth—better adapted in form and position to the power that moves the lower upon the stationary upper jaw—take their place. The usefulness of the deciduous molars for grinding purposes decreases soon after the sixth-year molars make their appearance, and from three to four years later the bicuspids take their place, having mostly single roots and smaller crowns. This arrangement as to the change of form in the succeeding bicuspids, which occurs in man and the apes, does not take place in animals that have long jaws, as their permanent premolars are exact duplicates of their deciduous ones. This is owing to the different arrangement in the attachment of the muscles that move the jaw. The arrangement and development of the deciduous teeth in man are further examples of the same laws—the cuspid cuts the gum a few months later than the first molar, but a little before the second molar ; whereas, in the second set, both bicuspids appear before the cuspid ; the deciduous cuspid being carried over to the eleventh or twelfth year, the last remaining tooth of the deciduous set ; and there is no necessity for its earlier displacement, notwithstanding it is gradually removed from the power that moves the jaw. Being wedge-shaped, it would always be of service in the anterior portion of the jaw. In point of lever-power in the undeveloped jaw of man, the deciduous cuspid represents the first bicuspid, the first deciduous molar the second bicuspid, and the second deciduous molar the sixth-year or first molar of the second set. And thus we have presented in the human mouth remarkable instances of how the forces in nature modify and mould the forms of plastic material to suit the circumstances that surround them.

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* Read before the First District Dental Society of New York, and reported in the *Dental Cosmos*

As it is only in a child of four or five years of age that the teeth are perfectly formed, and as we find that before the fourth year the root ends are not quite formed, and that after five years they commence to be exuviated, we will take for our subject a set of teeth as found in a child's mouth between four and five years of age, and endeavour to describe them. The twenty deciduous teeth of a child of the above age are of a blue-white colour ; their parenchyma is much softer, and most of them are much smaller than their successors. The superior incisors of a child resemble all four teeth of a permanent set on a smaller scale, but present a more scalpriform appearance. They are situated, like their successors, in the anterior portion of the jaws. On their posterior surfaces they never have protuberances and blind indentures, and the sharp margins of their crowns are never serrated, which is usually the case in their successors of the second set during the first year of their appearance. Their round roots are frequently curved. The curvatures, however, are not directed as the curvatures are in the second set, from the anterior to the posterior, but toward each other ; that is, the point of the root of the right is nearly always directed towards that of the left tooth, and the root of the left tooth to that of the right. The deciduous cuspid it shaped like its successor—much smaller, its crown more tapering, and its root rounder and more peg-shaped, and when curved, the curvature is from posterior to anterior, and toward the upper lip. All that can be said of one side of the dental series is equally true of its opposite in the superior and inferior maxillaries. We will, therefore, speak of but one side of each series. The deciduous molars supply in children the place of the permanent molars in the adult, and nature has accordingly, on a smaller scale, formed them similar to the latter, with this difference—the first permanent molars of the superior and inferior maxillaries are always the largest, while, on the contrary, the first deciduous molars are constantly the smallest ; and, in so far as the successors of the deciduous molars are concerned, especially the upper, they are nearly alike in size, but always smaller than the deciduous teeth that preceded them.

Special Description of Superior Deciduous Molars.—On each side of the superior maxillary there are two of these teeth. During the age of childhood they complete the dental curve. The first is much smaller than the second. Its two broad cusps, which are provided with sharp margins, are separated by a deep furrow, which has an anterior and posterior direction ; the external protuberance is much larger and broader than the internal, and where its external side joints its anterior half at the dental neck or cervical border, it presents a rugged elevation. Furthermore, its crown, in a somewhat larger form, is similar to the first bicuspid that succeeds it. The three roots, however, which this tooth possesses have, with the exception that they are smaller and weaker, the same position, direction, and form as the roots of the superior permanent molars. Very often the posterior external root of this tooth is fused with the internal roundish root, forming a broad, shallow osseous lamella. The second superior deciduous molar resembles the first superior permanent molar on a smaller scale. It has, like that tooth, a crown presenting the form of a rhomboid, one of the acute angles directed to the anterior and outside, and the other to the posterior and inside, with four ridges, with three roots formed like those of the permanent set, but much weaker and softer. It can be distinguished from the first deciduous molar by its greater size, by its contorted square crown, and the four cusps which are present ; also from its mate on the opposite side. The right and left deciduous molars can be distinguished one from the other by the marks that I have mentioned. If the posterior external root of the first superior deciduous molar is fused with the internal round root, the circumstance must not be forgotten that it is always the posterior external, therefore the smaller, root which becomes united with the internal round root, and that the free root is always the anterior and larger one; then all doubts will be removed. When the two external roots are free and not conjoined, and are nearly of equal size, then the projecting elevation of the first superior as well as the inferior deciduous molars is to be taken into consideration, which will be sufficient to distinguish the right from the left; for, if the right were held to the left, or the left held to the right side, the projection, which is always situated on the anterior half of the external side of the crown near the neck of the tooth, and consequently near the cuspid, would be either toward the anterior internal or posterior external, which is never the case.

Deciduous Teeth of the Inferior Maxillary.—All that has been said of the upper incisors applies also to the lower; only the lower are much shorter, smaller, and, like the larger upper teeth, they are not serrated on the sharp margins of their crowns. Their roots are not compressed laterally, as in their representatives of the second set, but are rounded. The deciduous cuspids have the same form and position as the permanent cuspids—much smaller, crowns more club-like, and tapering abruptly to a point, with round-formed roots. The inferior deciduous molars, two of which are on either side of the jaw, are the last and most posterior teeth of a child. The first and most anterior of these teeth joins the cuspid on each side of the jaw, and is different, both in size and form, from the second. Both the deciduous molars on either side have an anterior to posterior directed elongated crown. The first one is much smaller and narrower, and on its grinding surface are two indentures—the anterior indenture being the smallest, the posterior the largest. These indentures are separated from each other by an elevation, the external and internal ends of which form a cusp. Of the four side surfaces of the crown of this tooth, which are all more or less arched, the anterior and posterior are very narrow, the internal somewhat wider, the external the widest, and on its external surface can be seen, at the most inferior part of its anterior half of the cervical margin, a rounded, large, projecting protuberance, which is similar to that on the superior corresponding tooth. This protuberance on the external wall of the crown gives these teeth the appearance of a more inwardly inclined direction than they possess. This tooth is provided with two roots, which, on a small scale, are disposed like those of the permanent inferior molars; only the external margin of the roots of these teeth is broader, and serves, in connection with the broader and more arched external surface of the crown, as a mark of distinction between the right and the left.

The second inferior deciduous molar, on a smaller scale, has entirely the form of the first inferior permanent molar, and, with the one on the opposite side, is the only one which on the superior surface of its crown has five cusps, three of which are situated externally, and two internally. Of the three external cusps, the anterior is the largest, and the posterior the smallest. The two internal ones are of equal size. Now, the base of the first and second external cusps, where they join the cervical margin, is strongly arched, and, as in the first molars, the external surface of the crown at this point appears to be more inwardly inclined than it really is. This tooth has also two roots, resembling those of the permanent first molar; they are somewhat softer, narrower, and shorter, and their broad ends are either divided into two small points, or terminate in a diagonal or horizontal line. Since the roots of the permanent molars have rounded points, the deciduous molars are easily distinguished from the permanent ones.

In making a special division of a human tooth, we find three parts to be considered—the crown (corona), the neck (collum), and the root (radix). The crown is the strongest and thickest portion of the tooth, is more or less completely covered with enamel, and projects into the oral cavity. The neck is the shortest part of a tooth, is situated between the root and the crown, is not enamelled, and is more noticeable on teeth that have several roots than upon those that have but one. In the healthy state it is covered by the gums until advanced age, and where it joins the crown the enamel ends around its whole circumference in a gradual thin margin. Each tooth has either one or more roots. They are the thinnest and longest of the tapering portion of the tooth, and when in place, are invested their whole length by the cells of the maxillary bones. The neck and the whole external surface of the root or roots of each tooth is invested with a peculiar cuticle or membrane, which should not be confounded with the periosteum of other bones. The texture of this membrane is quite different from fibrous membrane. It is a peculiar membrane of a compound character, adhering by one surface only to the roots of the teeth, and not connected to the cell-wall by its own substance, but receiving its nutrient vessels through the numerous foramina of the cell-walls. Furthermore, the cell-walls are neither lined with a periosteum nor any other well-defined membrane. There is, however, a very delicate pellicle of membrane of a serous character lining the cell, continuous with, and covering the, cell-surfaces of the cancellated bone of the alveoli. Teeth, like all organised bodies that are thrown off from a parent stock, are provided with a placenta or investing membrane of connective-tissue. In the course of time, or after it has served its purpose, a retrogressive physiological metamorphosis commences, by which the deciduous teeth are exuviated, together with the alveoli that surround them, giving place to a physiological, progressive metamorphosis, which brings up the permanent set with new alveoli and increased size of the maxillaries. The pathological phenomena which have been so long observed on the membrane of the dental root, in the frequent inflammations which affect these parts, show conclusively that teeth are peculiar bodies, and have no affinity with other bones; for we find, by long experience, that coalescence never takes place between the roots of teeth and the cell-walls, which are in close contact, for the reason that dental roots and their cell-walls are heterogeneous; yet the roots of two adjoining teeth will coalesce when brought in contact by previous inflammatory destruction of dental septa, because the roots of teeth and their investing membranes are homogeneous. All experience teaches that only those bones become united whose uniting surfaces are of the same texture, in consequence of a pathological process. Thus, two bones that are covered with bone-membrane will unite by adhesive inflammation, or two bones that are covered with cartilage, by exuding a unifying substance, become united, as in anchylosis. How fortunate it is that the teeth are so constructed that their roots cannot coalesce with the bone-walls that surround them. Were it otherwise, the frequent inflammatory conditions to which the several members of the oral cavity are subject during a lifetime would render the removal of teeth, in case of necessity, exceedingly dangerous.

Special Description of the Permanent Teeth.—In the description of a permanent set of teeth, I will take the skull of a twenty-five-year-old subject, in which the teeth are perfectly developed, healthy, and very little abraded. If, however, we would wish to see the three small cusps on the large and small incisors, and occasionally on the cuspids, their crowns must be examined during the first months of their appearance; for later these cusps are worn off, being soft, and after a year they are entirely gone. These small cusps are never present on the deciduous teeth. Since there is a great difference between the teeth of the superior maxillary and those of the inferior, I will endeavour to describe each tooth separately.

The superior middle incisors are situated near each other in the anterior and middle of the alveolar curve. Each has a wedge-shaped form ; the postero-anteriorly directed crown is distinguished by an anterior and posterior surface ; an internal, an external, and an inferior margin. The anterior surface is somewhat smooth, and in length and width is slightly arched ; the posterior surface is narrower, somewhat concave, and frequently uneven. Both surfaces are widest at the inferior margin, and become gradually narrower toward the neck of the tooth. Of the two lateral margins, the internal is the longer and the external shorter and slightly arched ; they unite with the inferior sharp margin at two right angles, of which the external is always rounded. By this rounding, which is always toward the lateral incisors, the right incisor may be distinguished from the left. Where the two lateral margins meet and unite with the inferior sharp margin they are narrowest, but they gradually become wider to the superior, and where they are lost in the neck of the tooth they are broadest. Therefore, the inferior part of the crowns of all the superior incisors are broader and thinner at the inferior, but toward the superior, near the dental neck, they are narrower and thicker. Thus the wedge-shaped form of these organs is described. The root of the large middle incisor is always single rounded, but somewhat angular, presenting its broadest surface to the anterior, its obtuse angle to the posterior, with its point or apex terminating bluntly. If the roots of large middle incisors should be curved,—which is seldom the case,—the bend is always directed to the lateral incisor. When the points of the roots of permanent teeth are bent, no matter to what species they belong, either in the inferior or superior maxillary, the curvature is always directed toward the adjacent posterior neighbour ; consequently, from the internal to the external in case of the incisors, and from the anterior to the posterior in the rest of the teeth. On each side, between the front or middle incisors and the cuspids, there is one lateral incisor. They are similar to the front incisors, but smaller. Their crowns are also directed from superior to inferior outward ; they are a little shorter, and on their anterior surface more arched ; the external angle, which is near the cuspid, is more rounded than that of the central incisors, and their roots are also single, somewhat rounded, slightly depressed laterally on both sides, and dull-pointed. In some cases the roots of the lateral incisors are longer than those of the middle incisors, and the relative length of the crowns to the roots of all the superior incisors is as 1 to 1½ or 2. The superior cuspid is placed between the lateral incisor and the first bicuspid. It has a slightly external direction from the superior to the inferior; a strong, thick, club-shaped, angular crown, which generally increases in width and thickness from the neck to its middle, where it again decreases inferiorly until it ends in an obtuse angular point. It has two surfaces and two margins. The external surface is strongly arched in its length and width on the side towards the lateral incisor; the internal surface is slightly uneven, and is obliquely directed from above downward and outward. On the internal surface are two small depressions, which are separated from each other by an oblong ridge in a superio-inferior course. On the two puffy, bow-shaped, lateral margins of the crown, the posterior has a larger and more bulging curve. This and the stronger arch on the anterior half of the external surface serve as a mark of distinction between the right and the left cuspids. The root of this tooth is simple, very strong, and generally straight; but sometimes the point is bent, always to the posterior; its lateral sides are more or less compressed; wherefore result two surfaces and two margins,—the external margin much thicker than the internal. The relative proportion of the crown to the root of this tooth is as 1 to 2 or 2¼. The cuspid must always insert itself between two teeth that have previously taken their place in the dental series; the second bicuspid also has to find its way between the first bicuspid and the first molar, but, owing to its form, presenting flat surfaces towards its neighbours, it is not as likely to be displaced as the cuspid, and the alveolus being wider in its region, it has fewer difficulties to surmount. The displacement of the cuspid or other teeth never takes place in other animals. This is owing to the inter-dental space, which is always present in the dental series of other animals.

Between the cuspids and the molars there are two premolars on either side, which in man and the apes are bicuspid. Along their whole length they are anterio-posteriorly compressed. On the crowns of these teeth, there is one external and internal much curved, an anterior and posterior lightly curved, and an inferior, hollowed, uneven surface, which is separated into two ridges by a depression that has an anterio-posterior course, of which the external ridge appears larger and thicker than the internal, the latter being less extensive and lower. Extended from the depression of the inferior surface there are two small fissures or rimosities toward the large ridge, and also two toward the smaller. The posterior surface of the crowns of these teeth is shorter and more arched than the anterior, which gives to the crown an inclined appearance posteriorly. This, in connection with the external larger ridges or cusps, is the mark which distinguishes the bicuspid teeth of one side from the other. The crown of the first superior bicuspid is a little smaller than that of the second. Each of these teeth has usually a simple straight root, compressed from the anterior to the posterior, which frequently is divided into two points at the extremity. When two roots are present, each has a round form, and the larger one is situated at the exterior, and the smaller and shorter one to the interior. When, however, two roots are present, it is generally the first bicuspid that possesses them. When the roots of these teeth are not separated, they present the appearance of having two roots connate, and in a majority of instances they have two root-canals. The relative proportion of the crowns to the roots of these teeth is as 1 to $2\frac{1}{4}$ or $2\frac{1}{2}$. According to these relative lengths, one might infer that the bicuspids were longer than the cuspids. This, however, is not the case, for what they gain in the length of their roots they lose in the length of their crowns. So also are the crowns of the superior and inferior incisors, as well as the cuspids, normally one-half higher than the bicuspids and molars ; but the teeth of the latter species, notwithstanding the greater proportionate length of their roots, still do not exceed the total length of the former. The superior molars have the strongest and largest crowns ; they are placed in a vertical direction from above downward, and possess the greatest number of roots. On each side of the dental curve there are three ; the first one is the largest, and since the second one is in form quite similar, though smaller, a description of the first will answer for the second. The third molar, or wisdom tooth, which is generally the smallest, we will consider separately, as it is altogether different from the others. The first superior molar is the largest ; has, like its adjacent neighbour, a crown resembling a rhomboid, and this rhomboid form is prominent in all the superior molars, so that they appear contorted ; the crown of the second is more contorted than the first. In all such contorted crowns one of the acute angles is directed to the anterior and outside, and the other to the posterior and inside. On this contorted crown there is an external and internal, somewhat arched; an anterior and posterior, less arched, and an inferior, hollowed, uneven surface, which is the grinding surface, and upon this surface are four protuberances formed by two intersecting furrows. The two external protuberances are generally the largest; the internal the smallest. These teeth have three roots when in a normal condition, but it frequently happens that they are in partial or whole union with each other. Two of these roots are toward the exterior, and one of them to the interior. Of the external roots, one is situated anteriorly and the other posteriorly. Both are compressed from the anterior to the posterior, and each has an anterior and posterior surface and an internal and external margin. They diverge from a broad base out of the neck of the tooth, and gradually decrease until they end in a flattened point. The anterior one is always broader and longer than the posterior. The internal root is nearly round; arises from the middle of the tooth's neck with a strong basis, and becomes gradually smaller in its course until it ends, after describing a bow-shaped curve, with a dull, rounded point. The roots of these teeth as to length are quite variable, especially in the wisdom-teeth. The marks of distinction between the first and second molars consist in the larger size of the roots and crowns of the first, the roots of the first being more divergent than the second.

Superior Wisdom Teeth.—On each side of the arch there is one which completes the superior set of teeth. In form and size it is quite dissimilar to the other molars. Its crown is the smallest, and frequently it has only three cusps, two of which are external and one internal. Of the two external cusps, the anterior is always the largest. Its roots are generally three-fold, sometimes four and five, and the alveoli being lowest where the tooth is located, its roots are generally small, stunted, and contorted in development, and more frequently blended together.

Inferior Teeth.—The teeth of the inferior maxillary are generally smaller, and in form somewhat different from the teeth of the superior maxillary, which meet them in opposition when the mouth is closed. The four small incisors are the smallest teeth in the oral cavity. Their position is vertical, and the surfaces and margins of their crowns are transverse to their roots. The two central ones have narrower crowns and shorter roots than the lateral ones. The two middle small incisors are situated in the extreme anterior part of the inferior alveolar curve. They possess an elongated, small crown which is wider above than at its cervical border. They have an anterior surface slightly arched; a posterior surface slightly excavated from above downwards; a superior margin which is sharp, and two lateral margins bluntly arched and thicker below than above, where they join the superior sharp margin on both sides at right angles. The roots of these teeth are single, and are flattened laterally, presenting two lateral compressed surfaces from above downward to the extreme point of the root. In the middle of these surfaces there is a depression or groove which continues to the extreme point. At the bottom of the groove the osseous wall is very thin, which separates the two surfaces, especially towards the point of the root, where it is transparent. It has two rounded or puffy margins, the anterior slightly larger than the posterior. Since the crowns of the middle small incisors are alike, the distinction of the right from the left can only be found in their roots, which generally have a slight curve to the external. When this curve does not exist, which is seldom the case, then the distinction becomes almost impossible. The two lateral small incisors resemble the middle ones, only they are larger and stronger in all their proportions. Their crowns are more arched on their exterior margins, which gives them the appearance of being broader. The external angle towards the cuspid is always rounded. Their roots are longer and broader than those of the middle small incisors; and, in respect to size and length of root, can be compared to the large middle incisors of the superior maxillary; but in the reverse order, for in the incisors of the superior maxillary the middle ones are the larger, and have longer and stronger roots than those beside them, while in the incisors of the inferior maxillary the middle ones are the smallest, and those beside them are the largest. The inferior lateral incisors are easily distinguished one from the other by their rounded external corners and the outward curvature of their roots. On each side between the lateral incisors and the first bicuspid there is one cuspid, which has a long, dull-pointed, inwardly and backwardly inclined crown, the external surface of which is arched in all directions. The internal surface is slightly excavated from above downward; it is obliquely cut, leaving two longitudinal depressions. The posterior and anterior thick margins on both sides of the superior part of the crown form a blunt angle, inclining toward each other until they unite in a rounded summit. The posterior is somewhat shorter than the anterior. The external surface near the lateral incisor is more arched than that toward the bicuspid, where it is turned inward, and appears a little larger; and all these marks serve to distinguish the right from the left cuspid. The root of this tooth is thick, long, and somewhat compressed from the anterior to the posterior, and is strongly tapering. It has an anterior surface toward the incisor, and a posterior surface toward the bicuspid; an external thick and an internal thinner margin. The marks of distinction by which the inferior cuspids may be known from the superior are as follows: The crown of the inferior in its whole outward construction is weaker, less chubby, but longer, and in its thickness more regular than the superior tooth. Its root is more flattened, furrowed in its whole length, and shorter. The first inferior bicuspid has a short, round, and, especially from the outside, strongly arched crown, which is inclined toward the second bicuspid. On its superior portion are two protuberances,—the external one stronger, higher, somewhat pointed, and directed towards the tongue; while the internal is smaller, very low, less arched, very dull, and straight. Between the two cusps are two small depressions, which are separated from each other by a small ridge, which joins the two cusps from outward to inward. This ridge is generally lower in its middle, and sometimes it is incised. If the latter is the case, the two depressions are connected with each other. The single rounded roots among the permanent teeth are fonnd only with the superior incisors and inferior bicuspids.

(*To be continued.*)

OUGHT I TO HELP AN UNQUALIFIED DENTIST?—A medical man naïvely seeks an answer to this question from a medical contemporary! Were it not a fact that the average medical man knows really nothing about dentists, their qualifications, their status, etc., one would have thought the question superfluous. As it is, we are grieved, but not surprised. Ask a qualified man what he thinks of a bone-setter, and he replies, "He is a sweep." Well may we note, retaliate and say, that unqualified dentists are "sweeps"? And if doctors expect us to support them rather than quacks, we must beg the same courtesy at their hands.

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POST-GRADUATE COURSES OF STUDY.

Among men who really care to maintain their grip upon the science of the day, there is often a great want felt of some means whereby they can become learners without going back to the school and class-room. The man of one generation back, can only regard with amaze the methods now taught, the doctrines inculcated, and last, but not least, the to him tremendous mental gymnastics looked for in the examination-room.

The fond parent who hopes to bring up his promising offspring to his own profession, wonders, with mixed feelings, how he (the *paterfamilias*) would fare were he to face the implacable examiner, and commit himself to that pleasant process which, after much perturbation and disturbance of the sympathetic system, results in "pass or pluck." The honest head of the house thanks a kindly fate that he saw the light in those good old days when men were more careful of their port than their science. But, while we allow that "the world went on very well then," we know that the present is a time of awakening, and that all men are wont, now-a-days, to be estimated pretty shrewdly, and, if found wanting, are liable to be labelled "ignoramus" or "charlatan," with scant enough ceremony.

In spite of that caustic couplet, in which the brothers Coleman apostrophised—

> "My grandmother had a donkey,
> And when you looked that donkey in the face his face was sad;
> And so is yours, my British public—"

the British public is less of an ass than some are purblind enough to think, and is apt to take exception to those professional men who, having first scraped through an examination and secured a diploma, fail to execute the practical side of their career efficiently. It is hardly open to question that there are more "failures" in life after the school career is over, and the diploma won, than before. While a youth is constantly in friction with his teachers and his fellow-students, most of whom are at least anxious to qualify, he is strongly impelled to do himself credit, if only to avoid losing *caste*. When, however, the professional *débutant*, flushed with the burning glories of being an L.D.S., finds the discipline relaxed, and that he is his own master, how prone is he to mistake licence for liberty, and by idleness and lazing to dissipate his hard-earned knowledge. When the true life-battle begins—his father dead, perhaps, and he is thrown upon his own resources—he finds to his cost that his veneer of knowledge is very thin, and has to be handled with exceeding care, lest unfriendly hands strip it off and reveal the uncloaked nakedness beneath. Nor are these classes the only two sections of our profession which would be benefited by the institution of post-graduate classes. Even the hard-working student finds much to unlearn when he qualifies, and further, soon recognises how much of his profession, as a science, he has to master, before he can in any way take the rank of a scientific exponent of a profession which, if it is not a science, is nothing. Now, were it feasible to start in London, classes held by men of known and recognised merit, they would prove most valuable to a very large number of individuals. There would surely be no real difficulty in securing the services of those who have paid more attention to some particular branch of our profession; such men are to be found in different parts of the United Kingdom, and have shown their ability to leave home when the interest of the profession needed their presence in the metropolis. The method which would seem to commend itself would be a post-dental polyclinic, which, while seeking aid from all, should not be bound to any one hospital. A board of management would, of course, settle details, and develop from a theory an actual accomplished fact. We have yet to learn whether there is sufficient "go" and energy in English dentists to inaugurate in England a system greatly needed, and one which has already been successfully worked both in America and on the Continent. If we pride ourselves on our dentistry, and uphold it as equal to any elsewhere, we are bound to keep pace with the times, and to maintain the educational status of our practitioners as well as of our students. We have been told that the learned societies are intended to fulfil the functions of a post-graduate course. They may be so intended, but they fail in the fulfilment. They give a valuable means of ventilating men's ideas, or imperfectly recognised facts, but woe be to the man who ventures to teach; he is—and we hold justly—deemed to be a bore, and not improbably will be told so. No; every cobbler to his last. The learned societies have their functions, and we hope we shall soon be able to say that the "English post-graduate classes for dentists" have theirs.

HYDRONAPHTHOL—A NEW ANTISEPTIC.—Hydronaphthol is, according to Dr. Fowler, of Brooklyn, a non-poisonous, non-corrosive antiseptic and disinfectant. It has a slightly perceptible aromatic taste and odour, and crystallises in scale-like clino-rhomboid laminæ, of a silvery-white or greyish hue. It is a derivative of the hydroxyl substitution of naphthalin. It is said to be from ten to fifteen times more efficient than carbolic acid. As an antiseptic, it is about one-fifth as powerful as corrosive sublimate; from one and a half times to double the strength of iodine, and four times as strong as sulphurous acid, and it is thirty times as powerful as salicylic acid. Hydronaphthol, besides being non-poisonous and non-corrosive, is a non-irritant. Its odour is not sufficiently strong to disguise that of putrefaction, as happens with carbolic acid. It is not decomposed or rendered inert by the products of putrefactive decomposition, and this property renders it invaluable in disinfecting pulpless teeth, besides its being far more stable than carbolic acid, not being volatile at ordinary temperatures. Hydronaphthol is soluble in water, (1 in 1,000); a solution which is powerfully antiseptic, while a solution of one to ten thousand prevents putrefactive decomposition. It is freely soluble in alcohol, ether, benzol, glycerine, and the fixed oils. Dr. Eschanzier has employed it in dealing with pulpless teeth, and has found its use satisfactory as an antiseptic. He dissolves the hydronaphthol in glycerine, and introduces a saturated cotton pellet into the pulp-canal, which has already been prepared in the usual way. One application alone seems to act effectually. All soreness, if there be any, disappears in the course of twenty-four hours, as also all traces of putrefaction. At the second sitting he removes the dressing, syringes with tepid water, and proceeds to fill the canal permanently with cotton, saturated with oxy-phosphate and hydronaphthol prepared by mixing in the proportion of one part of the hydronaphthol to four of the oxy-phosphate. The same practitioner has treated chronic alveolar abscesses with success, by using hydronaphthol dissolved in glycerine and forced through the point of discharge.

COUNTER-IRRITANTS IN PERIODONTITIS.— Poulet, writing in the *Pharmak Zeitung*, proposes the following formula as a pain-killer. Capsicum (20 parts) is digested with alcohol (100 parts) and Liq. Ammoniæ (10 parts) for four weeks. The digest is then filtered and one part each of chloral and oil of thyme are added. This mixture is endowed with the high-sounding name *Apone*, and is said to be a reliable "pain expeller." We should recommend caution in its use, as its ingredients possess a pretty strong counter-irritant capacity.

A STRANGE HALLUCINATION.—A patient in the city asylum on Ward Island, N. Y., is, says the *Southern Dental Journal*, wearing his life away under the delusion that his teeth are filled with dynamite, and that if he brings his jaws together he will be blown to atoms. His condition is said to have been brought on by undergoing intense suffering during some dental operation.

NEW HÆMOSTATICS.—The methods of checking bleeding are important, and therefore interesting to all surgeons, but especially to dentists, who so often have to deal with troublesome hæmorrhage after tooth extraction. When such hæmorrhage occurs in the case of "bleeders" (Hæmophiles) the matter assumes alarming importance. Dr. Morales, of Barcelona, has found hazeline, extract of witch-hazel, when locally applied, to act successfully as a styptic in hæmophilic patients when all other means, not excepting the thermocautery, have failed. Dr. Morales is of the opinion that it acts by constricting the vessels as well as by producing coagulation. Dr. C. G. Rothe, of Altenburg, has discovered a reliable hæmostatic in the infusion of *urtica didica* (nettle).

SERIOUS ORAL BLEEDING AFTER A LEECH. *A propos* of bleeding, we find the following in *Vratch*, Dr. E. N. Mikhnevitch describes the case of a middle-aged, moderately nourished, non-hæmophilic peasant woman, who was brought to him with all the usual symptoms of severe acute anæmia, and with incessant spitting of blood. According to her statements, having suffered for three days from toothache, she applied a leech to her gum. The leech fell off, but since then (more than twenty-four hours), the wound was bleeding profusely all the time, in spite of the use of cold and a solution of perchloride of iron. The hæmorrhage was immediately arrested by plugging with styptic cotton-wool (*gossypium ferratum*).

FILLING FOR PULPLESS TEETH.—The editor of the *Dental Register* has found Iodoform a useful filling for pulpless teeth. After removing the *debris* of the pulp, it is directed to wash out thoroughly with alcohol and work in with a broach a thin paste of iodoform made either with alcohol or glycerine. When the root is full, wipe away the surplus and cover with oxyphosphate. The whole operation, including the filling, may safely be done in one sitting.

APPLICATION FOR NEURALGIA.—Among the many neuralgia specifics we have used, we have found but few as useful as a mixture made by rubbing together equal parts of thymol camphor, menthol and chloral. We are all familiar with their use separately, and when combined they appear to possess above what they exercise out of combination.

THE ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.—We are requested to state that the first meeting of the Odonto-Chirurgical Society of Scotland, for the session 1886-7, is announced to take place on Thursday evening, November 11th, at 30, Chamber Street, Edinburgh, when a paper will be read by J. Symington, M.D., F.R.S.E., on the position and relations of the teeth in children, illustrated by frozen sections.

Abstracts of British & Foreign Journals.

INDEPENDENT PRACTITIONER.

ON CERTAIN FERMENTATIVE PROCESSES IN THE ALIMENTARY CANAL, AND THE MICRO-ORGANISMS BY WHICH THEY ARE PRODUCED.

By PROF. DR. MILLER, Berlin.

THE mouth furnishes better conditions for the growth of micro-organisms than either stomach or intestines. The juices in the stomach and upper part of the small intestines, oppose the development of bacteria, while in the mouth, the most diverse nutritive materials are provided with free access of air and favourable temperature. The largest number found by Dr. Miller in any one mouth at the same time is eleven, not including the well-known *Leptothrix buccalis*, *Spirochætæ dentium*, and *Vibrio buccalis*, which no one has as yet succeeded in cultivating. The fermentative and putrefactive changes in the human mouth correspond to a great number and variety of micro-organisms. Under favourable conditions these develope into most deleterious varieties, so that a slight scratch on the finger from a root in an unhealthy mouth may produce blood poisoning.

Dr. Miller has isolated twenty-five different kinds of bacteria from the secretions of the human mouth; twelve are cocci and thirteen bacilli or bacteria.

Twelve of the mouth-bacteria he finds again in the fæces, and eight in the contents of the stomach. In the latter case the material for the investigations was furnished by a gentleman who could evacuate his stomach at will, an hour or two after partaking of a small quantity of fruit. Each time the oral cavity was carefully cleaned and sterilized with sublimate, one to one thousand, in order to prevent the intermixture of fungi from the mouth. That the micro-organisms really came from the stomach, and not from the mouth or œsophagus, could readily be seen by their large numbers. Cultivations from the buccal saliva produce small colonies; those from the stomach contents produce very large and numerous ones.

Probably all bacteria enter the stomach with the food; possibly some traverse back from the pylorus; probably all intestinal micro-organisms come from the stomach, possibly some enter by the anus.

The resistance of many micro-organisms to the action of the gastric juice may be thus shown: About three hours after a moderate meal, 70 cc. of the contents of the stomach are evacuated and placed in the incubator under exclusion of air germs. Three hours later, by means of plate cultures, Dr. Miller found three kinds of bacteria, two yeast and one mould fungus, and after ten hours one bacterium form, and the yeast and mould fungi still living. Not till after fourteen hours were all bacteria missing. The Blastomycetes and Hyphomycetes were naturally not affected by the acid. A fungus in an artificial gastric juice may lose its vitality in a short time, but yet may pass safely through the stomach, because:—

1st. The swallowed fungi at the beginning of a meal do not pass into a stomach filled with gastric juice, but into an empty stomach with a neutral or alkaline reaction, where free hydrochloric acid, in detectable quantities, does not appear until after the lapse of one-half to one and one-half hours.

2d. The fungi are often imbedded in solid particles of food, thus escaping for a while the action of the juice.

3d. Liquid substances do not remain long in the stomach, but soon pass into the duodenum, and carry with them the fungi before any considerable quantity of gastric juice has been secreted. In a case of fistula in the upper part of the duodenum, Busch saw the first portions of food appear fifteen or twenty minutes after the beginning of the meal. In case of soft or liquid food, the transit may begin still sooner.

In order to reproduce as nearly as possible the conditions present in the normal stomach, Dr. Miller chewed up a quantity of bread and meat, added a small proportion of liquid (milk), and divided the mixture into portions of 26.0 cc. each.

These portions were brought into small flasks, sterilized and then infected, some with a very sensitive vibrio, the others with hardy ferment-bacteria from the stomach. To each portion was now added every ten minutes 2.0 cc. of an artificial gastric juice, containing 0.4 per cent. H.Cl., (1.6 per cent. H. Cl. solution of sp. gr. 1,1233), so that at the end of the second hour, the mixtures contained each 0.2 per cent. H. Cl., corresponding to the most active point of normal gastric digestion, which has been determined to come at about the end of the second hour or a little later, when the acidity of the stomach has reached its highest degree. Cultures made during the course of the experiments from the different flasks showed that the least resistive of the micro-organisms experimented with retained their vitality till the end of the third half-hour, and sometimes longer, and that the less sensitive ferment-bacteria did not grow fewer at the end of the experiment, and, in many cases, some of them were still found six to eight hours later. Inasmuch as portions of food pass into the duodenum in less than half an hour after taking food, these experiments seem to indicate that any micro-organism swallowed at the beginning of a meal might readily pass through the stomach alive. The case is somewhat different, however, if the fungi are swallowed when the digestion is at its most active stage (second and third hour). Experiments representing this stage of digestion showed that very sensitive putrefactive bacteria may thus be destroyed within ten minutes, while the hardiest ferment-bacteria may resist four hours.

Hence the conclusion appears warranted that all fungi which are swallowed at the beginning of a meal may pass alive into the intestines, while of such as are swallowed in the second or third hour, only those which are less sensitive to the action of acids retain their vitality.

Koch found paralysis atonicity essential for development of certain micro-organisms.

DENTAL COSMOS.

DISCUSSION UPON COCAINE, BEFORE THE NEW YORK ODONTOLOGICAL SOCIETY.

Prof. R. Ogden Doremus said his attention was called to this subject while president of the Medico-Legal Society, by a letter, giving a description of a case of what was suspected to be fatal poisoning by cocaïne. The facts of that case were that a Mrs. Castor was found unconscious, breathing heavily and irregularly, pulse very low, left pupil largely dilated, and face spasmodically drawn up towards the dilated eye. There was a spasmodic action of the left arm and upper part of the body at regular intervals, during which she clutched the bedclothes, and twice succeeded in vomiting. Salivation was excessive, and the heart seemed almost exhausted. After several hours she died. It was ascertained that she had been using a solution of cocaïne for toothache; the vial containing the unused cocaïne was sent for examination. It was found that the contents were a four per cent. solution. The diseased teeth to which the cocaïne was applied were situated on the left side, *i.e.*, the side on which the pupil was dilated and the muscles were in spasm.

Before the Medico-Legal Society, Dr. H. J. Boldt gave the results of his experience with the drug when administered to patients, and of his experiments with it upon animals. Cocaïne administered to a dog caused profuse salivation, while with the cat salivation was not as marked, but the animal died in twelve minutes. Dr. Boldt injected fifteen minims of the four per cent. solution for a patient who was suffering with severe occipital neuralgia, and almost immediately she began breathing rapidly ; her countenance flushed, the pulse rate increased, and then came pain in the cardiac region, dyspnœa, dizziness, and in two or three minutes the patient fell off the chair unconscious. The breathing then stopped entirely, and artificial respiration and electricity were resorted to, the former being kept up for half-an-hour until respiration of a very uncertain sort began. It was over an hour before the patient was able to leave the office, walking then much like an intoxicated person, and when she reached home she vomited, although that may have been caused by the stimulants given her. Dr. Boldt had other cases where the same phenomena were observed, though in a less violent form—the patients recovering without artificial respiration or electricity being used—and he has injected as high as twenty minims of the four per cent. solution, without any bad effect being produced ; but he looks upon the drug as a poison, which is to be used only with great care.

Another case is given, in which a gentleman had partial paralysis of the muscles of one side of the face and neck a few hours after cocaïne was applied to the cavity of a tooth.

It is composed of carbon, hydrogen, nitrogen, and oxygen, in proportions very closely resembling morphine and other poisons. All these alkaloidal bodies are compounds of three gases and one solid. The speaker urged caution, and not alarm. He urges cocaïne should be scheduled as a poison.

At present, cocaïne has not been found detectable *post-mortem*.

Dr. E. F. Hoyt said he consulted his dentist about his teeth. One of them, a right lower incisor, was decayed below the gum and was exceedingly sensitive to the ordinary process of excavating ; in fact, excavation was almost unbearable. Some cotton was saturated with the four per cent. solution of cocaine and allowed to remain in the cavity a few moments, when he imagined the tooth was less sensitive. The excavation was then continued, and when the pain became too severe more cocaine was applied. These applications were made five or six times during the two hours' operation, after which the cavity was filled with gold ; but, on account of the slight anchorages obtained, the filling came out during the polishing process. The act of filling was painless. The cavity having been carefully filled with a preparation of cloride of zinc, the tooth remained perfectly free from all sensation. Forty-eight hours later, in attempting to swallow some coffee, it escaped from out the right side of the mouth, and it was found that paralysis of the muscles adjacent to the tooth that was affected had come on. The extent of the paralysis, it was thought, must have taken as much as forty-eight hours to develop. During the next two days the paralysis extended from its original site, involving the whole right side of the head ; the right eye could not be closed ; this lasted for ten days.

A continuous current of electricity was used. At the end of ten days improvement occurred, at the end of seven weeks the action of the muscles was perfectly restored ; but for over a year that side of the face continued to be particularly sensitive to changes of temperature. The cerebral condition for three or four months after the operation was something similar to what would result from a person taking an overdose of morphine. For several weeks the brain was intensely sensitive, so that, after reading much, depression followed.

The explanation offered to account for the paralysis, is, briefly, that a neuritis followed the irritation caused by the cocaine, and that the dental operation acted as an adjunct.

Dr. Kingsley, upon being informed that the tooth was very sensitive, said : The statement that has been made is exceedingly important. If the pulp was exposed (which I am a little loth to believe), and the cocaine was applied to the surface of that exposed pulp, a gold filling inserted, and that filling replaced with something else, I think we, as dentists, would say there was sufficient justification for the belief that paralysis might result from the operation irrespective of the application of cocaine. The important question is, Was the pulp exposed, or was it not?

Dr. Hoyt said the tooth had been perfectly free from sensitiveness since that time ; he thought the pulp was exposed.

Dr. J. W. Clowes said he was glad to see this cocaine excitement coming to an end. When gentlemen appeared here some months ago with headaches, inflamed faces, and other abnormal conditions, induced by injections of cocaine, he was sure a professional *craze* was in progress. This craze he believed had reached its height, and more sensible views were now prevalent. He had used cocaine, and found it of little value in its effect upon sensitive dentine. It is practically useless in dental offices, and its absence need not be a matter for regret. A better agent he found in chloroform ; he saturates cotton—the size of a large pea—with it. Let some be inhaled, some swallowed with the saliva, and the cotton itself applied to the cavity. Then proceed with your excavation. You may repeat the chloroform, if you like, *but only once.* The magical effect will soon show itself, without any appearance of anæsthesia in the patient. So eminently satisfactory will be the result that a mutual gladness will prevail.

Dr. Weld had had considerable experience in the use of cocaine. The reports of untoward symptoms following the use of cocaine are said to be in striking contrast to the clinical observations of hundreds of the best physicians and surgeons in the United States who have used this drug without injury for months. It has been stated that cocaine is of no earthly use in a dental office. You all know that the taking of impressions is sometimes attended with the most profound distress to the patient, and inconvenience to the operator ; the patient gags, and it is sometimes impossible to take the impression. By using cocaine in the form of a spray, thrown from a common hand-atomizer upon the wall of the pharynx, that difficulty is completely overcome, and in five minutes the impression can be taken without trouble. There is another use for it. Laryngoscopists have occasion to explore the throat very frequently, and they use cocaine with great success where there is this *reflex trouble* and *hyperesthesia of the parts* to which he had alluded.

Dr. Kingsley believed there was something infinitely better than cocaine to assist us in taking impressions. It was skill. Cultivate that, and you do not need any cocaine ; nor do you have to wait five minutes for the patient to get ready for the operation. He is constantly taking impressions of cleft-palate cases without any previous treatment, and not one in a hundred of those or any other cases develops a retching or other trouble during the operation, and he attributes it to his lack of skill when they do. His experience with cocaine for any purpose does not encourage his making further trials.

Dr. J. Morgan Howe said cocaine has such wonderful properties when applied to soft tissues, especially to mucous surfaces, that its sphere of usefulness in dental practice should not be overlooked, although it has disappointed our hopes that it would produce anæsthesia of dentine when applied to it. In the fall of 1884 he made a report to the profession on some of the first if not *the* first, experiments that were made by himself and a few friends—Drs. Perry, Payne, and Ives—in regard to the local effects of cocaine on the dental tissues. The same uncertainty and unreliability that appeared in those few reported cases has followed the history of its application to dentine ever since, the expected effects being so seldom apparent that it is not worth while to use it.

The speaker deprecated the use of hypodermic injections of cocaine to produce unsensitiveness of dentine. He thinks, however, there is a use for cocaine in the dental office. In cleaning the roots of teeth, the use of cocaine solution, where the operation is to painful to be borne, is perfectly legitimate. In the opening of abscesses, and the probing of sinuses, it has often been of great service to him, and in one case it was very useful in taking an impression. Last week a gentleman desired a full upper denture, whose disposition to nausea and vomiting, on the contact of anything foreign with the palatine arch, was very great. He had several sets of teeth which were unsatisfactory, and it seemed as if this local and reflex excitability had been the cause of the previous lack of success ; for he said there had been nine impressions taken for the last set that was made, and now the speaker could hardly touch the roof of his mouth with a finger without producing violent nausea. The whole difficulty was overcome by lightly moistening the hard palate, and as much of the soft palate as he could touch by the most gentle manipulation, with a solution of hydrochlorate of cocaine, applied with a wad of bibulous paper held in a pair of Dr. Bogue's tape-forceps. The application was made twice, with an interval of two or three minutes, and a plaster impression was then taken without any difficulty whatever, although it happened that, through an error, the plaster used set very slowly. The result was very satisfactory, both to the patient and to himself.

OHIO STATE JOURNAL.

IRRITATION.

By Galen, Xenia, O.

Any morbid excitement of the vital functions not amounting to inflammation is termed *irritation*. This may be due to a variety of causes—an excess of food, drink, air, heat, light, and electricity ; and from the action of acrid or stimulaitng substances, such as medicines or poisons, or produced within the body as acrid secretions—healthy, retained secretions—products of chemical changes, parasites, or alterations in the blood, or from miasma, contagion, and epidemic influence.

Undue excitability may provoke excessive action, when a corresponding period of exhaustion should follow, to which must succeed a sufficient period of repose to recruit the over-taxed energies.

A want of proper stimulus may cause the vital powers to rest or be restrained, and upon the removal of this restraint, an undue amount of excitation ensues, which interferes with health, and becomes a morbid condition. Hence, depressing influences, if only temporary, indirectly produce irritation by reaction.

Continuity of parts, of a similar structure, are the most favourable to the spread of irritation. Thus, if one point in a serous membrane becomes affected, the disorder spreads very rapidly, and frequently involves a large portion of the tissue before its course is arrested.

An investing membrane often communicates a diseased condition to the organ it covers. But parts often sympathise which are distant from each other, and have no immediate connection. We have numerous examples of this, the heart and the stomach furnishing quite a number. Thus we have a brain injury, and gastric irritation as a sequence, with nausea and vomiting.

The facility with which irritation may be produced, depends on the general condition of the system.

When excitability is equally distributed, and all the organs are acting healthily, disease can find no point unguarded. Elevation above, and depression below, the standard of health, equally produce the diseases of irritation.

A full habit, in which the blood is excessive in quantity, and too rich in quality, though the complexion be good and the digestion normal, nutrition active, and the other functions in apparent good order, still it is not an evidence of vigorous health. To such, the slightest irritant is sufficient cause for diseased action. The blood being so stimulating as to bring every organ to the highest point of action, a slight stimulating tendency crowds the system beyond its capacity, and the result is disease. When irritation is so caused, the blood-vessels are usually involved, and inflammation is liable to occur

A system enfeebled by depletion, by abstinence, by imperfect digestion, or any other cause, is often irritated ; over-excitement is sometimes present, and becomes a large factor in causing disease.

The nervous system is the point attacked, and the attack gives rise to neuralgia, spasm, etc.

In various diseases, particular organs acquire increased excitability, and produce disorder, when the same cause in health would produce no effect. Hence, the system, when in an enfeebled state, is said to be irritable because it is easily excited into disorder, and often runs into inflammation. But though a state of debility predisposes to a nervous derangement, and functional disturbance, it also disposes to inflammation. In certain diseases, particular organs acquire increased excitability and distress, that in health would not be noticed.

When an irritation has been produced, it often continues for a time, after the originating cause has passed away.

When the system has been affected by irritation, or any agitation, time is required for the various organs to assume their wonted calm of health, the system to move on without interruption ; still, where irritation assumes a permanent form, there is reason to expect constitutional disturbance.

It is easy to conceive that, by increasing the stimulation of all the organs, the excitability in reserve may be brought into action, and a general exaltation of the vital functions be pushed beyond that of health. But as there is only a certain amount of blood, and as it is necessary to have an increased supply to produce exalted function, it follows that universal irritation is impossible; because, the blood must be held everywhere in equilibrium, and there could be no accumulation in the body in general, sufficient to produce irritation. But there can be a superabundance of blood in a part, at a given time, that will give rise to the effects of irritation, which may become universal. It has not been, nor can it be proved, that there never has been a case of general irritation; but such a case does not long continue, for the excitement must soon pass away, and depression follow. When a stimulating agent is universal in its application, certain organs are much more susceptible than others to its influence; and these first being excited to a high degree of irritation, absorb all the excitability, and call off from other organs the influence that might be sustained by them, if the agent was local in its application.

In the operation of general stimulants, irritation arises in some organs, and depression in others, and this is still more common when the operation of the same is partial. In a great majority of diseases there is a mixture, or blending, of the two opposite conditions, though the preponderance of the one or the other, gives tone or force to the subsequent disease.

We often see irritation in a part remote from the real point of lesion—as when the disorder attacks a tissue, upon the due action of which some other part or parts depend for the ability to perform their functions. This muscular motion, to a certain extent, depends on the supply of nervous influence from the brain, spinal marrow, or ganglia. Irritation, therefore, in either of those structures, or along the tract of any ganglionic branch, may produce great disturbance, and be the cause of disease. Hence, paralytic, spasmodic, and convulsive affections, with many derangements of the secretary functions, often depend upon the diseases of the nervous centres.

It is no doubt true that each particular function dependent upon nervous influence receives its supply from filaments or tendrils peculiar to itself, or direct from the brain, or cord, which presides especially over it.

A certain degree of cold benumbs the sense of touch, while the sensibility of painful impressions, so far from suffering diminution, is increased, and, in certain morbid conditions, the touch is exceedingly acute, while the sensibility to painful impressions is almost, if not altogether lost. Hence, teeth may be drawn, and many surgical operations performed, while the parts are in this condition, and scarcely any pain be felt.

Magendie has shown that sensibility and the power of motion depend, in many instances, upon distinct nerves. But each part, in an association of parts devoted to the same office, has distinct nerve fibres, by which it communicates with the source of its power, and that each muscle is thus provided. Nearly every variety of functional derangement may have its origin in irritation of a single point in the brain-cord or ganglia, or the nerves that connect these organs with the seat of the function; and remedies addressed to the actual seat of disease will soon prove beneficial, while, if confined to the apparent point of lesion, they prove of no avail.

THE DENTAL REGISTER.

THE PROPER CARE OF POOR CHILDREN'S TEETH.

By J. Hooper, Louisville.

The writer discusses: First. The relation which the children of the poor sustain to the public at large. The parents and grandparents of the poorer classes of children have the same affection for their offspring as the wealthy.

Second. The design of teeth.

Twenty deciduous teeth, thirty-two permanent teeth are provided for the purpose of masticating the food essential for our development and sustenance. Without the proper mastication of food, indigestion and many diseases arise which prevent growth in childhood, retard education, and entail many ills which "flesh is heir to." A healthy state of the teeth often insures success to the man of business and to the professional man alike. How important, then, that a perfect foundation be laid in the saving and care of the little one's teeth! The first teeth are of more value than is generally supposed, from the fact that they lay the foundation for the permanent teeth which have such an influence on our after-life. Many cases are reported where diseases of children's teeth have produced diseases of the eye and ear. The teeth, then, it is urged, must have a most important influence on man's system, and hence they must be well cared for. Many chronic cases of disease are occasioned by the neglect of children's first teeth. If a child's teeth hurt it, a failure to masticate its food will result therefrom. This may continue through months and years, and habits be formed which may follow the child throughout life.

Third. It is asked, what are we as a profession, state, or nation, doing to advance the cause, th proper care of poor children's teeth?

The definition of the word "Dentistry" signifies treatment of diseases of the mouth and teeth, filling and saving of the teeth. Statistics testify to the truth that the enormous sum of 22,000,000 teeth are annually extracted in America; how can we, the writer asks, allow the sacrifice of such valuable organs and enter no protest against it.

A few casts were shown to exemplify what serious deformities occur by the extraction of teeth, especially among children. If we extract a tooth the cavity will in course of time become closed, or if we file teeth they will come together again unless a shoulder is left. When teeth are filed, as they usually are, with a flat surface, the form of the tooth filed in this manner is changed, hence unnatural.

In a cast of a child of seven years of age it was shown that she had several teeth extracted four years ago, when but three years of age, which should have remained until she was nine or ten, that the jaw might grow with the child. The deformity and the contraction are pointed out, and how it must disfigure her. When she cuts her permanent teeth she will be classed with the irregulars.

A case of a girl is described. She was sent by her dentist, who extracted both of her upper six year or first molars about ten months previous. In that short space, the upper arch contracted so that the under teeth protruded nearly half an inch beyond the upper teeth when the mouth was closed.

In another cast where a young man had his cuspid or eye teeth extracted by a dentist who informed him they were tusks. He was quite small then, but has grown to manhood now—twenty-two years of age. A cast of a little girl's teeth at three years of age is the same size. In another cast a gentleman had a bicuspid extracted, and that side of the mouth is the same size as the child's.

In a number of cases of children's mouths, it was shown that they were disfigured by the extraction of teeth, the centre of the mouth being drawn to one side. The arch of the mouth in such cases meets the fate of the arch where brick or stone are removed—there is no perfect arch ! The articulation and mastication are both interfered with when the arch is made imperfect.

The writer visited several charitable institutions, and inquired about a number of others, and found that but little had been done for the teeth of the children, except extract them, and found in a few instances where some dentist has filled teeth for some of the larger children, but such a limited number, that, as a profession, we could claim no credit for our charity.

The importance of seeing to children's teeth is recognised by the state, at least among the military, as bad teeth reject a candidate for the Military College.

Literary Notices and Selections.

DR. HERBST AT THE AMERICAN DENTAL ASSOCIATION.

On motion of Dr. Fillebrown, Dr. Herbst was invited to address the association. His remarks were again translated by Dr. Bödecker.

He remarked that he would not repeat what he had said in New York and Philadelphia. It was well known that he had come to this country to exhibit his method of packing gold in the cavities of teeth. By this method, gold is brought into contact by rubbing against the walls obtaining the best possible adaptation, much better than by malleting. For the success of this method much depends upon the cavity, which must have four side walls. If the tooth has not got them, they can be supplied by means demonstrated in his clinics. The patient would certainly recognise with gratification the difference between the hammer and this method. All that is done in first-class fillings with the mallet can be accomplished by this method of rotation, and there is a decided gain in time required for the introduction of the gold, in the weight of gold introduced, in adaptation to the walls of the cavity, and the consolidation of the several layers with each other. He said it was well known that the best operators in the profession, all the world over, are found in America, and he had come to this country believing they would be honest and generous with him. In Europe he had shown his method to a great many of his *confréres*, but as yet they had done but very little with it. While admitting that many American operators were men that the world cannot reproduce, very able men, who can do with their own methods more than he has ever been able to do with his, he nevertheless believed that with his method much good might be done. It was very much easier, more rapidly acquired, and demanded less skill than the mallet method. He did not believe, and did not hope that the mallet would ever be abandoned. In fact, he endorsed the advise of Dr. Bödecker, that it was safer for the beginner to use the mallet in the last layers of the filling. What he might say would be of very little consequence in comparison with the demonstrations which he hoped to give. Talking about it would not help very much, and he could not show it to all. The particular point was to be very careful about the first layer of gold introduced into the cavity. He said that he felt he was not going back without having accomplished some good. Some had comprehended his method thoroughly, and he would trust them to show others. He begged them, however, not to throw it entirely away without a trial, not only for themselves, but for their patients, who would derive great satisfaction from it. He said that, to him, many of the best American operators looked fatigued and worn out. By practising his method they would save time and not have to work so hard, while they would accomplish more, and do it easier. In conclusion, he hoped, in another year, to meet them all again in Washington, at the International Medical Congress.

Dr. Ottofy asked Dr. Herbst to state in a few words the advantages of his method over ours ; if better, in what respect is it so ? He asked permission to address the question to Dr. Herbst in his own tongue.

Dr. Bödecker replied for Dr. Herbst, that the first claim was for better adaptation of gold to the walls of the cavity than could possibly be obtained by any other method, as had been proved in the New York clinics to the satisfaction of everyone who had examined the work then done, and also by the work done by Dr. Herbst several years ago. It was by the perfect adaptation of gold to the walls of the cavity that the tooth is saved. Gold may be hammered against smooth glass walls, and the microscope will show that the adaptation is not perfect; but if a soft piece of gold is put in, with tweezers or hand plugger, and with a rotating instrument pressed down, or by a rotating burnisher in the dental engine, and it then be examined under the microscope, it will be found that there is absolute contact. Glass shows this better, as the contact can be seen in all portions. If such a filling is put in carmine or aniline solutions, there will be no discolourations between the gold and the glass, while in the best malleted filling thin solutions of aniline will penetrate.

Again, one-half the time is saved. In the proximal surfaces of molars and bicuspids, extending under the gum—which are generally difficult and tedious, as a rule—great advantage is gained, the most difficult operations becoming the simplest of all. In the grinding surface of molars it is better to use the mallet for the last layer, as access is easy, and a wearing surface is more readily made with the mallet by beginners. Patients who have experienced both methods will certainly ask you to fill by the Herbst method, rather than suffer from the mallet. I know it from my own experience, and all those who have had work done by both methods will bear me out.

Dr. Atkinson said the exposition of this method would not be complete without giving the Herbst obtunder.

Dr. Bödecker stated that when Dr. Herbst told him of it two years ago, he then felt as though care must be exercised, and he did not know whether he would dare to bring it out. He was sorry now that he had not given it sooner, for his experience had shown it to be perfectly safe.

A little chemically pure sulphuric acid is saturated with hydrochlorate of cocaine, and stirred with a glass rod until perfectly dissolved. This will give a test of the chemical purity of cocaine. If the solution remains uncoloured, it is pure; if the sulphuric acid gets dark, it shows impurities (as carbonaceous matter) in the cocaine. To this solution is added sulphuric ether to super-saturation, still stirring with a glass rod, and it is best done in a long test tube. If shaken in a bottle, the expansion is liable to break the bottle, or force the cork out, the contents perhaps flying in the eyes. Any excess of ether will evaporate by standing. A little of the preparation is to be taken on cotton and applied to the sensitive dentine. The obtundent effect is more prompt and perfect than with anything else that has been offered for the profession. It will obtund only one layer of dentine, when another application must be made, but its action is very prompt. Measurement is not necessary to obtain the proper proportions of cocaine and sulphuric acid, as the acid will not take up more cocaine than is requisite. The cocaine relieves the momentary pain caused by the application of the sulphuric acid.

Dr. Taft said that it had been his privilege to spend three days with Dr. Herbst. In regard to the obtundent, when the formula was given him, it struck him as rather peculiar. He had taken it home and made it up carefully, and found that one drachm of sulphuric acid would dissolve thirty grains of crystals of cocaine. The amount of sulphuric ether was not important, as any excess would evaporate. He had used it daily for three months, and in every instance it had proved successful, and he believed it would prove generally efficacious. Its action is very simple. The sulphuric acid dissolves a portion of dentine ; acting as a caustic on living tissue, the cocaine obtunds sensation during its action. The sulphuric ether serves the same purpose, relieving the pain caused by the application of the sulphuric acid. If the cavity has been formed before the application, there is no objection to leaving the powder formed of the dissolved dentine.

Though the Herbst method may not be generally adopted for all cases, there is much in it that can be utilised. It cannot be comprehended from printed instructions, it must be seen to be understood. Many will adopt it, to a large extent, for many operations and in many kinds of cavities. It is especially advantageous in cavities without angles or depressions, or points for anchorage. Sometimes, when a large mass of gold is rolled up and packed in, it is difficult to press it down and have perfect adaptation at all points ; while condensing at one point, it will withdraw at another ; or, if by another method little pieces are to be held down, it is difficult to secure uniform pressure everywhere. In such cases, Dr. Herbst takes a pellet of cotton and fills the mouth of the cavity, and, holding it down, goes all over the cotton with a rotary pressure. On removing the cotton, the cavity will be found gold-lined throughout, the adaptation being apparently perfect—though we should be very careful in the use of that word. If we take a stone in which there is fine engraving, this method may be employed to bring out the finest lines of carving. Gold is laid on and rubbed down through the cotton, when the carving is perfectly reproduced in the gold; it is pressed into the minutest lines. If only for this perfect adaptation to the walls of the cavity, it is well worth trying.

Dr. Marshall said that, having been a patient of Dr. Herbst, his experience might be of interest. He was ready to say that, as a patient, he preferred the Herbst method to the mallet; the suffering was less than one-half as severe. The cavities filled were a molar crown cavity, and a compound distal and grinding surface of a bicuspid. The pressure was very heavy, as heavy as hand pressure in cylinder fillings; so much so that his jaws ached, and he had to support his chin. The pressing and drawing motion gave a sharp click as it came against the walls of the cavity, and the feeling was as if the wall was broken by the blow. It was, however, only the sensation of the peculiar motion.

Dr. Atkinson said that Dr. Bödecker wrote him from Bremen that he had witnessed something new, which he would love. He had thought that he would never need anything but the mallet, but not until now had he really comprehended what the rotary method meant. He had witnessed sixteen clinics, four of which he had seen all through, one being in his own mouth, so that he knew both ends of the instrument. He was now ready to say that he had received a new revelation. There was never anything to equal it for surface fillings; he had tested it, and knew it to be the densest he had ever seen. He had induced Dr. Herbst to try number 120 rolled gold, and it had worked beautifully in a skeleton, and in the jaw. Then he tried platinum and iridium-gold for wearing edges, and succeeded with that also. He recommended anyone, if he did not succeed, to go to some one who had been indoctrinated, and learn of him. He had feared the elimination of heat from rapid rotation, but had worked with a slow motion of the engine, giving a peculiar twist with the thumb and forefinger. Anyone who had learned hand-pressure could easily pack towards the wall of the cavity. The sensation of the agate point striking against the edge of the tooth was startling at first, His last words would be, should we never meet again, try it until you comprehend it, and you will never abandon it.

Dr. Marshall said (of friction and heat) that in the first cavity he had experienced no sensation of heat, but in the second, whether from moisture or what not, the gold lost its cohesion, and he thought it would have to come out. He took a heavy instrument and rotated it rapidly, producing sufficient heat to restore cohesion.

Dr. Rehwinkle said that, from a sense of gratitude to Dr. Herbst, and of duty to the profession, he would tell what he knew of the Herbst method. Three years ago he first heard of it through the German journals. In going through their contents, he found the report of a clinic by Herbst, at Frankfurt-on-the-Main, and exclaimed to himself: "Hello! here is a new method by rotation; rubbing in the gold; it is certainly fascinating in theory." So he went home, and, guided by the description thus given, began to experiment, using tin foil to avoid the waste of gold. He pegged away, but not having any standard of comparison, did not know whether he was on the right road or not. Learning that Dr. Herbst had shown his kindness and self-sacrifice by going from one office to another to exhibit his method, he wrote to him for specimens showing the steps of the process.

The response was prompt, and, with his characteristic generosity, he sent, not only a full line of specimens, showing all the stages of the operation, but also a set of his instruments, matrices, etc.

The only question, and one which time alone can answer, is, whether it will prove durable. He would not repeat what had been already said as to the method of operating, or the apparent perfection of the work, but could fully corroborate it all. If used only as a lining for cavities, preventing the discolouration of amalgam against thin borders, it will be a great acquisition. The cavity can be thoroughly lined with gold, and the body of the filling made with amalgam. In this case, the surface of the gold should be painted with a thin solution of copal varnish, to prevent it from being affected by the mercury in the amalgam. Dr. Herbst can make a gold filling by his method in one-fourth the time it would take any other man by any other method. It gives close, or perfect adaptation, using this word in its general sense. Coming from the same country, and from the neighbourhood of Dr. Herbst, Dr. Rehwinkle offered that as his apology if he seemed too enthusiastic about the man and his method, and especially his great liberality in freely giving all he has for the benefit of the profession.

Dr. Bödecker, by request, gave again, in full detail, the manner of operating, from the preparation of the cavity to the surface finishing.

Dr. C. N. Pierce said he felt satisfied that the results would prove of great value. Even if not generally adopted, the younger members should take it up, and study it faithfully, not being discouraged if their first efforts failed, remembering that, although Herbst himself had been using it for seven years, he admitted that it was only within six months that he had become fully satisfied with the results in certain cases, especially in contour work. He advised beginners to experiment on cavities in bone, or a tooth brush handle.

Dr. Watkins spoke with great satisfaction of fillings which Dr. Bödecker had made for him, by this method, two years ago, which have been exposed to severe service in mastication. A large filling in the anterior proximal surface of the third molar was very satisfactory; this was finished with the bloodstone instrument.

Dr. Bryant, of Switzerland, said that the method had proved very acceptable in his country, its special features being its great adaptability. For matrices he used very thin stumps of steel, such as watchmakers use for supporting the pendulum of clocks. It is extremely thin, and can be cut with scissors like paper, and it will go where silk floss cannot pass.

Dr. Morgan was not so sanguine of the anticipated benefits to be derived from the introduction of such an innovation.

Dr. Jas. Truman foresaw great danger to pulp life in the indiscriminate use of a dangerous escharotic as an obtunder of sensitive dentine.

Dr. Bogue at this point said, he would like, from the depths of his own ignorance, to ask *what the Herbst method is?* He would be much obliged for a clear definition.

The President asked Dr. Bödecker to reply, and he did so, with additional explanations from Dr. Rehwinkle.

Dr. Bogue did not think that the principles underlying the method had yet been reached, except in so far as it was a revival of the principles laid aside twenty-five or thirty years ago, in the hands of a very dexterous operator. Not a single new principle had been evolved. He had seen one hour and ten minutes consumed on a gold filling which he himself could have made in twenty minutes, with soft gold. He was glad to hear Dr. Rehwinkle say that Dr. Herbst was a modest man, but, with all his claims, his principles were as old as the hills. It was the old story of the revolving cycles.

Dr. Fillebrown said that in the discussion, everything but Herbst *versus* the mallet was left out of consideration, as though there had never been any intermediate method used.

But there were operators who made very creditable operations without the mallet and without the matrix, and who had never tried the Herbst system. They had found that great force was not essential ; that it was not necessary to hammer all the life out of both the gold and the tooth ; that light hand pressure would produce a hard surface that would wear for years, resisting both the force of mastication and the inroads of fluids.

Dr. Taft thought the reasoning of Dr. Truman on the action of the new obtunder was hardly borne out by the facts. Sulphuric acid has been used for years in surgery, and its action is well understood. An agent so violent as is portrayed by Dr. Truman would have long ago been found utterly impracticable. While it is true that it is an escharotic, it destroys only one layer, and then it stops. It is self-limiting, and not capable of doing that mischief portrayed by Dr. Truman. His only fear was that some might be deterred from using an agent capable of rendering great service.

Dr. Rehwinkle added that Veratria was also a valuable obtunder, but should be used with great caution, as it is a dangerous poison. One grain of Veratria is put in three drops of absolute alcohol, and sufficient tannin added to saturate ; ten drops of glycerine is then added. It is to be applied after the dam is in place and the cavity dried.

Dr. Bödecker affirmed the perfect safety of Dr. Herbst's obtundent, having seen its excellent effects in teeth of very delicate structure, of children ten or twelve years of age, which have stood gold fillings perfectly for several years, with no bad results whatever ; an exposed pulp even, having survived, and the edges of the filling were found absolutely perfect. They were teeth in which he would not have put gold under any circumstances, but Dr. Herbst considered that gold fillings, after the application of this remedy, were the best that could be used to preserve delicate teeth.

Dr. Taft said that the action of the sulphuric acid was to break up the calcareous surface of the cavity, forming a layer of sulphate of lime, an insoluble powder, the cocaine protecting the exposed organic portions of the tooth. Its action was not capable of being carried any further. The acid is satisfied with what it has dissolved, and the powder formed is insoluble.

Dr. Atkinson said that chemists themselves were sometimes at loose ends about their combinations, but in dealing empirically, if uniformly successful, no harm was done. We should not be alarmed by old fogies who don't know the first letters of the alphabet of chemistry. Some agents are self-limiting, and we know exactly what they will do. Sulphuric acid is one of these. Of others, however, we do not know where the mischief will end. Chloride of zinc quiets a nerve by transforming the pulp into hypochloride of albumen—as clear as glass quite to the apex. He wished to speak in defence of the man who cannot speak English for himself, and he only wished he could speak German to tell him how much he loves and admires him, not as a personality, but for his principles. And if we would only put ourselves in the line of reception, our friends would soon be convinced of what is true light and wisdom.—*Independent Practitioner.*

Dental News.

MANCHESTER ODONTOLOGICAL SOCIETY.

The first meeting of the second session of the above society was held on the 5th Oct., at the Grand Hotel, Aytoun St., when the President delivered his inaugural address, in which he treated of necessity of a practical education for the dentist, and the supreme importance of local dental societies, where, by the discussion of professional matters and intercommunication of ideas, this education can be carried on throughout a lifetime. The rest of the evening was taken up in examining a large selection of dental instruments and appliances, exhibited by the Dental Manufacturing Company. The officers of the society for the current year are—President: Dr. Parsons Shaw; Vice-Presidents: Messrs. P. Headridge and L. Dreshfeld; Councillors: Dr. P. Betts, Messrs. Henry Campion, W. Dougan, W. Dykes, J. H. Molloy, and G. W. Smith; Hon. Treasurer: Mr. H. Planck; and Hon. Secretary: Mr. George G. Campion.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The next Meeting of the above Society will take place on Monday, November 1st, at 8 p.m., when communications will be given by Messrs. S. J. Hutchinson, A. S. Underwood, Walter Coffin, Storer Bennett, J. H. Mummery, A. P. Reboul, W. A. Hunt, &c., &c.

David Hepburn,
Robert H. Woodhouse,
Willoughby Weiss,
Hon. Secs.

N.B.—The Editor of the "Transactions" desires to state that the issue of the June Number has been delayed, owing to Mr. J. W. Groves' numerous and pressing engagements, which have prevented him from sending a copy of his Paper read before the Society at the last Meeting. The issue of the Number will shortly be made.

OBITUARY.

THOMAS MAHONIE, L.D.S.

Our numerous readers will be surprised and distressed to hear of the shocking accident, which terminated fatally, to Mr. Thos. Mahonie, L.D.S., Blenheim House, Sheffield. On the afternoon of Friday, October 1st, Mr. Mahonie had made arrangements to visit one of his patients residing a little distance out of the town, and for that purpose was being driven in his carriage, accompanied by his eldest son, to the railway station. They had not proceeded far, when the horse, a powerful and spirited animal, became restive and unmanageable, setting off at a terrific speed down the principal thoroughfare at all times crowded with vehicles. The driver having lost all control of the horse, and seeing nothing but collision and disaster imminent, Mr. Mahonie sprang from the carriage, but unfortunately fell heavily upon his head. On being picked up he was unconscious (having sustained a severe fracture at base of skull) from which he never recovered; and, notwithstanding the attentions of eminent surgeons, he succumbed to the fearful injuries at six p.m. the same day.

Through this untoward event, Sheffield and district loses one of its best and leading characters, and the profession of which Mr. Mahonie was an honoured member for upwards of 30 years, one of its leading lights. The deceased gentleman was an elocutionist of rare power and ability; and, though a thorough Christian, his religious thought was never cramped or narrowed down by sectarianism, but, with a generosity peculiarly his own, placed his services ungrudgingly to aid all deserving and charitable institutions. At the time of his death, Mr. Mahonie was a member of the British Dental Association, was also a member of the Representative Board of the Midland Branch, and was the Treasurer of the Sheffield Association of Dental Licentiates.

Mr. Mahonie leaves a widow and two sons, to whom we tender our sincerest sympathy.

APPOINTMENT.

Mr. Geo. O. Whittaker has been appointed Dental Surgeon to the Victoria Dental Hospital, Manchester.

HOSPITAL REPORT.

Monthly Statement of operations performed at the National Dental Hospital, from Sept. 1 to Sept. 30, 1886:—

Number of patients attended...		2808
Extractions	Children under 14	452
	Adults	709
	Under Nitrous Acid	582
Gold Stoppings		60
Other Stoppings		679
Advice and Scaling		306
Irregularities of the Teeth		202
Miscellaneous...		170
Total...		3160

Isidore Fredc. Prager,
House Surgeon.

British Journal of Dental Science.

No. 452. LONDON, NOV. 15, 1886. Vol. XXIX.

MODERN METHODS OF ANÆSTHESIA.*

By Dudley W. Buxton, M.D., B.S., Lond. M.R.C.P., Anæsthetist to University College Hospital, Soho Hospital for Women, Assistant Anæsthetist to The London Dental Hospital, etc.

Mr. President and Gentlemen,—

The subject of anæsthesia is by some considered trite; many would say what little is to be learnt about the matter has long since been taught, and that therefore no further occasion arises why anyone should handle the subject unless in the course of didactic lectures. With these conclusions, gentlemen, I beg to join issue. I should say that, speaking generally, and of course excluding the present company, there was no subject about which less reliable information is obtainable, or concerning which the majority of medical practitioners are more hopelessly ignorant. Most men know the nice little bottle, labelled chloroform, which fits so comfortably into the breast pocket of your coat, and which suffices to produce narcosis without any bother or fuss. Most men have learnt by solitary personal experience that chloroform, when dropped upon lint, will produce narcosis, and they *pro forma* hold the hand of their patient to see if the pulse is getting feeble. Many will even listen to the heart sounds before administering the anæsthetic, and, this done, will commence the inhalation with happy confidence. Now I submit such a state of affairs is radically wrong. I believe I am within the mark when I say that the large majority of English students are never *taught* to administer anæsthetics, and during their hospital career have few, if any, chances of actual practice in anæsthetising. I have the honour to instruct in more than one of our large London hospitals, and I thus have abundant proof of how crass is the ignorance of pupil and practitioner. Gentlemen come in to see the operations, men possibly who have seen ten, twenty or thirty years practice, and who hail from all manner of places both at home and abroad ; they watch the process of anæsthetisation, and are utterly at sea about our methods, and earnestly interested as they listen to the exposition I am in the habit of giving to my students, first physiological then practical. And again, who have not seen, as I, alas ! have too often done, the advent of a new house surgeon or house physician, who when called upon to anæsthetise a patient, either has never seen the inhaler to be used or has never given the anæsthetic ; he has either the courage of ignorance or the timidity begotten by "a little knowledge." Of these extremes either may hasten the poor patient to an untimely death. Vain then, with Denham, to cry—

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* A paper read before the West Kent Medico-Chirurgical Society.

> "Come, I say, thou powerful God,
> And thy leaden charming rod,
> Dipped in the Lethean lake,
> O'er his wakeful temples shake,
> Lest he should sleep and *never* wake"—

and mischief done, the death is imputed to the anæsthetic or the patient's heart, and the administrator becomes, if not a better, at least a more cautious man. So long as men are allowed to narcotise patients without being duly instructed and practised under the teacher's eye, so long will casualties arise from maladministration of anæsthetics. Deaths rarely, very rarely, must occur from anæsthetics even in the practice of experts, but I am fully assured that when we make it an offence against the law for uncertificated persons to anæsthetise then will the death rate fall. Comparisons between the death rate of specialists in large practice compare most favourably with that of the hospitals and private practitioners. In Edinburgh, where chloroforming, the most dangerous method of inducing anæsthesia, is prevalent, the death rate is very favourable as compared with other hospitals and private practice, and simply because the subject there receives the attention of which it is worthy. We are as a body compelled to show evidence of having mastered that difficult surgical operation the vaccination of an infant, and yet are let loose upon society and allowed without let or hindrance to chloroform to death the whole of London should we so have a mind. But enough of this : I think I have produced the reasons why so many medical men, at all events at the early stages of their career, know so little of the subject before us. I will add further that I find myself very ignorant when I ask myself concerning the physiology of anæsthesia. Years ago the whole subject seemed so clear to me ; now I find actual experiment proves that much of our knowledge is erroneous, and that the more I know about the matter the more there remains to be learnt, and learnt by the test of an actual appeal to the facts themselves. If you take up the manuals upon the subject you will find many facts cut and dried ; these facts I used to believe, indeed they and the statistics formed the basis of my knowledge, as of that of others who had taken the pains to investigate the matter ; now I find most of these facts are fictitious, and the statistics of little or no value, save perhaps for the purpose of book making.

With the short time at my disposal I have no time to enter upon the more physiological part of my subject, but in case the matter is of interest to some of you I have asked your courteous Secretary to have distributed a brief *resumé* of the subject I read elsewhere.* But before I enter upon the purely practical part of my paper, I would remind you that the only ways we can accumulate knowledge of anæsthesia are, by direct experiment, and by the record of the pathology and morbid anatomy of the subject. Unfortunately, records of post mortem examinations are not made by persons specially cognisant with the subject, nor are cases in which difficulties or dangers arise brought to the notice of the profession. I, personally, should be very grateful indeed, if any member of this Society would acquaint me with authentic instances of peculiarities arising during the induction of anæsthesia, or should fatalities occur within the range of their influence, it they would permit me to either conduct the autopsy or be present during its performance.

What are the justifiable limits we should set to the employment of anæsthetics ? This question is one of much moment, and its answer involves the consideration of another and perhaps still more burning enquiry, viz. : What is the real aim in view when we place a person under the influence of an anæsthetic ? The fact that the answers to the above queries touch upon the ethics of the induction of narcosis invests them with an interest almost incomparable. Are we justified in inducing unconsciousness by narcotising agents (1) when the presumption is that by so doing we are placing the subject of our administration in no peril, save what is always incurred during anæsthetisation ?

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* "The Practice of Artificial Anæsthesia Local and General." See *British Medical Journal*, Sep. 19, 1885.

(2) When from some diseased condition of the viscera, such as fatty changes in the heart, degenerative transformation of the pulmonary or renal tissues, we know that the induction of anæsthetic narcosis is attended with conspicuous risk.

Let us answer these questions by attempting to make out a satisfactory solution to the problem stated above. What is our aim when we induce anæsthetic narcosis? On the first blush of the matter we should reply, that the amelioration of human suffering is our aim, and so we should have to strike a balance between the risk incurred by using anæsthetic agents, and the amount and continuance of pain which would accrue from performing the operation without them. A moment's reflection, however, reveals that the ends subserved by using anæsthesia are far wider than simply saving real or imaginary pain. Death from shock, so ably treated of by Savory,* is by him referred to the heart, which "is powerfully affected through the nervous system." Various regions of the frame appear to be peculiarly obnoxious to shock. When we provoke shock we imperil our patient's life, we may plunge him into collapse and jeopardise his very existence by our surgical procedure. Nor can we apportion the degree of collapse which shall ensue upon any given degree of gravity in surgical procedure. Death has followed the tapping of a hydrocele, the extraction of a tooth; while the ligature of the carotid or subclavian artery has been effected without anæsthesia and without conspicuous shock. Now the proper production of complete anæsthetic narcosis will largely abrogate shock, and so will enable us to undertake surgical procedure with comparative freedom from apprehension. Of course anæsthesia possesses dangers of its own, which must be taken into consideration. Again, precision and finish in surgical procedure cannot be arrived at unless the patient be absolutely quiet and passive; nor could the extensive departures in abdominal and brain surgery be attempted without the aid of anæsthesia. The wear and tear of the explosive nervous tissue of XIXth century frames caused by pain are very great, and seriously imperil life, or at best retard convalescence. Anæsthesia by narcosis is then a surgical necessity in many cases; a measure of expediency in others. What, then, are the risks on the side of the anæsthetic which must be considered as a set-off to the manifest dangers involved in a neglect of its use? I should place first the danger of the administrator, but, as I have dwelt upon that subject already, I will merely add that I am quite sure many deaths and still more failures of operations arise from the shortcomings of the anæsthetist. One example must suffice. Let a skilled operator be called in to secure a small loose body in the knee joint. Before anæsthetisation the position of the body is carefully ascertained and it is secured. The operation proceeds ; the patient is imperfectly anæsthetised or is allowed to partly regain consciousness ; he violently moves his limb, and—hey, presto ! away goes the loose body, and, in nine cases out of ten, cannot be recovered. As a result, of course, the operation fails. Ineffectual anæsthesia, *i.e.*, when the patient, although intoxicated, is yet in possession of his reflex acts, is a great and grave danger. In this condition he is, so to speak, wholly at the mercy of reflex visceral shocks ; the whole vascular system, and with it, of course, the heart, is completely overridden by reflex inhibitions conveyed along the vaso-motor fibres of the sympathetic ; in this state the patient may be killed by even so small a matter as the extraction of a tooth. You will find, not at all uncommonly, at the official enquiry which ensues upon such sad fatalities, that the anæsthetist will be duly asked how much chloroform or what not he used, and will glibly reply, " Only a drachm or less, hence the wonder ! " When the very smallness of his dose was the actual cause of death ! " 'Tis true, and pity 'tis 'tis true."

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* Collapse—Holmes System of Surgery (i.) 1883, p. 376.

Assuming, then, your administrator is one skilled in the use of anæsthetics, we next have to ask what danger belongs to the anæsthetics *per se*. I have not time to discuss the much vexed question of chloroform *v.* ether, I can only give you very briefly my conclusions.

Ether, when administered according to the method I shall shortly describe to you, is, I am convinced, the best general anæsthetic substance to use. When operations about the mouth, windpipe or nose, lasting some time, require the use of the actual or potential cautery, ether, from its inflammatory nature, must not be used. Persons who suffer from asthma, bronchitis, emphysema, if very pronounced, will bear ether badly. The stimulating effect which ether has upon the heart and vascular system renders it needful that caution should be used in giving ether to a person whose arteries are diseased, otherwise rupture and cerebral hæmorrhage may be induced. Again, I personally prefer chloroform alone or in the A.C.E. mixture for infants, if the narcosis has to be maintained for any great length of time, as the ether acts powerfully upon the delicate mucous membrane of the respiratory tract of children, and sets up bronchial catarrh sometimes even to the extent of causing alarm. With these exceptions, always use ether. But it is very important to use it properly; and then you will have no struggling, no stifled cries of "Oh, you're choking me!" and so on. The apparatus I have before me is the one I employ; it produces complete anæsthesia in from one minute and a half to two minutes, without struggling or discomfort.

(To be continued.)

THE DESTRUCTIVE ENERGY OF THE TINCTURE OF THE CHLORIDE OF IRON* ON THE TEETH —AN EXPERIMENTAL STUDY.

By George W. Weld, M.D., D.D.S., of New York.

Of all the heavy metals, it has been generally observed by chemists that iron is the least noxious. In the domain of therapeutics, as a remedy, it has for many years held a prominent position. It is one of the essential elements which is frequently found deficient in the *organism* of man, and which, as a restorative agent, is utilised by a majority of the physicians throughout the civilised world. Chemical analysis has demonstrated, time and time again, its constant presence in considerable quantity in the blood and hair, and in small quantity in the gastric juice, chyle, lymph, and in various other tissues and fluids of the body.

According to Gorup-Basanez (analysis of C. Schmidt), the blood of man contains 1 part of iron to 230 parts of red-blood globules, and that of beef, 1 part of iron to 194 of red globules. Dalton‡ states that iron exists in hæmaglobine, not in the form of a distinct oxide, but in all probability directly combined, like sulphur with the carbon, hydrogen, nitrogen, and oxygen, which form the remainder of its substance. Bartholow§ observes that iron performs a very important office in the rapid construction of red-blood globules, when it is administered in anemia. Without it, hæmaglobine is not formed, and the red-blood globules diminish in number.

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* Synonym: Tincture of the muriate of iron.

† A paper read before the New York Odontological Society, and reported in the *Dental Cosmos*.

‡ "Human Physiology," by John C. Dalton, New York, 1882, page 97.

§ "Materia Medica," by Robert Bartholow, Philadelphia, 1881, page 108.

In health a mixed diet contains sufficient iron for all purposes of the economy ; but in many forms of disease the blood is furnished with the material which it so much needs. The physiological action of iron, however, is not limited merely to the construction of red blood. When there is no intolerance to its presence in the stomach, it promotes the appetite and increases the digestive powers.

By increasing the disposition for food and the ability to dispose of it, iron acts as a stomachic tonic. In fact, it is the opinion of a number of eminent authors that the chief use of iron as a remedy is to promote the digestive functions. The same opinion is held regarding the simple and astringent bitters. The distinction generally made between the remedial effects of the iron and the bitters is that the utility of the latter is due more to its stimulative effect on the digestive function, and the retardation of the combustion process, than to any direct action on the blood.

But whatever the *rationale* of the remedial effect which iron seems to exert on the colouring matter of the blood, it can be of little, if any, practical importance to the dentist. Recognising its therapeutical value, he is compelled to look upon the adminstration of some of the preparations as a necessary evil.

The questions which are most likely to interest him are :

1. What preparation of iron is the best to prescribe, or shall be recommended most ?

2. In what degree of destructive energy do the acid and astringent properties of iron act on the teeth during the process of ingestion ?

3. What is the proper method of administration ?

To render the subject as lucid as possible, the following table of iron compounds has been prepared for your consideration, a slight review of which will be necessary to a complete understanding of their respective merits, or demerits, so far as they may affect the teeth :

CHALYBEATES.

Bland.	*Astringent.*
Reduced Iron.	Sulphate (ferrous) : Copperas.
Carbonate : Saccharated & Comp d.	Iron and Ammonia Sulphate (iron alum).
Pills, and Comp'd.	
Mixture of Iron.	Iodide (syrup, pills, and saccharated).
Phosphate.	Bromide (syrup).
Pyrophosphate.	Sol. Nitrate.
Oxalate.	Chloride : Liquor and Tincture.
Lactate.	Solution and Tincture of Acetate.

Dialysed.

Citrate.
Potassio-tartrate, and other tartrates and citrates.
Albuminate of Iron.
Hypophosphite.
Valerianate.

Disinfectant.

Sulphate (ferrous).

Styptic. (External use, local effects.)

Chloride: Liquor and Tincture.
Sol. Sub-sulphate.
Sol. Ter-sulphate. } Liquors.
Sol. Nitrate.

Special Virtues.

Tr. of Chloride.

Antidote for Arsenic.

Hydrated Oxide.
Dialysed.

The latest reports from the American Public Health Association show copperas to be a disinfectant no longer.

By a casual glance at this list, it is at once apparent that the number of the bland preparations far outnumber those preparations which in their composition are held to be both acid and astringent, and which affect the teeth so disastrously.

Naturally, then, the query presents itself to the mind of every practical dentist, Why are not these preparations, which, it is claimed, exert such a pernicious effect on the dental organs, excluded, and the bland ones substituted? It will be observed on again referring to the list of iron compounds that the tincture of the chloride of iron, which by many dentists is looked upon with so much disfavour, is classified as being possessed of special virtues.

The question of utility in the choice of the various preparations of iron often becomes necessary when the physician is called upon to prescribe them. There is also the matter of cost to be considered. Some of the preparations of iron,—such, for instance, as the citrates and tartrates,—although perhaps equally as efficacious in some cases, are more expensive than the patient can afford. Then the use of iron is frequently determined by a careful differentiation of the causes; the idiosyncrasies of each individual patient have always to be considered by the physician whenever its use is indicated.

The number of the preparations of iron generally used by physicians varies from one to fifteen,—the tincture of the chloride probably being the one most extensively used. Next in order as regards popular use, may be mentioned the carbonate, the citrates and sulphate, dialysed, the iodide, and the reduced iron. The albuminate, pyro-phosphate, phosphate, bromide, acetate, valerianate, and hypophosphite are used more or less according to the stand-point of merit or demerit as viewed from clinical observation made by each individual physician.

Of the fifteen preparations above mentioned, it may be said that the only ones which can exert an injurious effect on the teeth at the time of ingestion are those which are administered in the form of a solution, of which may be mentioned the tinctures and the syrups of the other forms, to which I have alluded.

Brief mention, therefore, will be made of the balance of the iron compounds, which are administered internally, by means of pills or compressed tablets.

The first on the list is that preparation known as reduced iron, or Quevennes iron. This preparation is neither astringent nor acid. It does not injure the teeth, nor damage the stomach. The objection to this form of iron is that it is apt to contain too much hydrogen and oxidise on exposure, and when impure to give rise to eructations of disagreeable gases of a sulphuretted or phosphoretted odour. The effect of the carbonate and the carbonate saccharated, so far as the teeth are concerned, corresponds to the first form mentioned. The objection to their use is that they have a constant tendency to decompose into iron rust (oxide of iron).* Of the phosphates and pyro-phosphates, the latter is generally employed, and by some thought to be one of the best members of the group, being soluble and bland, and not easily decomposed.

The next one of any practical importance on the list is the dialysed (ferric oxide in solution). This is a non-officinal preparation of iron which does not blacken or injure the teeth. When first introduced it was thought by many that it would prove to be the best form in which to administer iron, and afford a substitute for the tincture of the chloride ; but clinical experience has shown it to be inferior in many respects, and it has accordingly fallen into disuse.

The citrates and tartrates are used quite extensively. They are agreeable, bland, and for many forms of debility, when administered internally, produce very satisfactory results. The albuminate is a form of iron which of late has gained considerable favour with a large number of physicians. It is a combination of the sub-carbonate of iron, albumen and sodium, and is compressed in the form of a lozenge, or round tablet. It is considered the most bland of all the iron preparations, and is frequently prescribed for weak and nervous persons whose powers of assimilation have become very much enfeebled, and who are unable to take any other form of iron.

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*Bartholow's "Materia Medica,' Philadelphia, 1881, page 106.

Miable contends that the albuminate of the peroxide of iron is found in the blood, and that this is the basis of the red globules, and it has been shown that the presence of an alkali forms the cataytic change and that some of the iron salts —as, for instance, the ferro and ferri-cyanides of potassium, and other double salts which are not precipitated by the alkalies—are absolutely inert as remedies, and pass unaltered from the body.

The hypophosphite of iron possesses a double medical value, and is as much a phosphorus as an iron compound.

The sulphate of iron (green vitriol), although possessing decided astringent properties, is nevertheless administered frequently for increasing the appetite and promoting digestion. It is contraindicated when the stomach is delicate. It is often used in the preparation of the carbonate by decomposition with potassium carbonate, as in Blaud's pills.

The iodide is used principally as a specific in the treatment of anæmia complicated with constitutional syphilis. If used in the syrup form it tends to blacken and injure the teeth.

The bromide was introduced for the purpose of combining the tonic effects of iron with the sedative action of bromine, but it is not often prescribed.

The solutions of the nitrate, sub-sulphate and ter-sulphate are generally employed for external use, or for the local effect which they produce.

The tincture of the chloride of iron seems to have certain special virtues which the other preparations of iron do not possess ; and, notwithstanding its properties are extremely acid and astringent, it is frequently employed by physicians, not only in the treatment of anæmia, but also in large doses in the treatment of erysipelas, neuralgia, coryza, diphtheria, epilepsy, acute rheumatism, and other diseases which might be mentioned. It acts also as a diuretic ; even in ordinary anæmia many authorities prefer it to any other preparation, claiming that its effects are shown much more quickly and that it seems to act more satisfactorily. Almost all agree that it possesses special virtues, either constitutional or local, which render it useful in the above-mentioned disorders. These peculiar properties (especially the diuretic effect) are ascribed by some to a peculiar ethereal compound resulting from mixture of the liquor ferri-chloridi and the alcohol used in making the tincture, to which compound its odour is due.

At the very onset it must be apparent to the mind of every reflecting dentist that, whatever the virtues of the bland preparations of iron may be, the above preparation of iron possesses certain advantages and special virtues, and is most generally used at the present time, especially in dispensary practice, by a great majority of physicians. The complaints regarding the destructive tendency of this preparation of iron upon the teeth are as familiar to the physician as they are to the dentist. The direction, therefore, to the patients when taking this preparation of iron has always been to dilute with water,—a mode of administration, I will briefly say, at this point, calculated, strange as it may appear, not to decrease but rather to increase its destructive energy on the lime-salts of the teeth.

The results of the experiments of Dr. Smith,* of Edinburgh, Scotland, are interesting both to the dentist and physician. Dr. Smith experimented with eight of the compounds of iron, which, at the time the experiments were made—about twenty years ago—were most generally used as remedial agents. These were the saccharated carbonate of iron, twenty grains to an ounce of water ; carbonate of iron in the same proportions ; syrup of the phosphate of iron and phosphate combined ; the syrup of the iodide of iron and water, equal parts ; the citrate of quinine and iron ; the wine of iron ; the sulphate and the tincture of the chloride of iron.† On examining the respective solutions after twenty-four hours the teeth were found unaltered in those of the carbonate, saccharated carbonate, phosphate, iodide, citrate, and the sulphate. In the solution of the wine of iron the liquid itself was somewhat turbid : the teeth, however, appearing to be untouched. In that of the chloride of iron, a turbid sediment filled the bottom of the bottle and covered up the teeth from view ; the fangs of the teeth were somewhat soft and flexible and the enamel easily scraped down. The sediment under the microscope presented an amorphous appearance. In conclusion Dr. Smith further says that, from the facts obtained from the results of his experiments, it would appear that certain preparations of iron when directly applied do exercise a powerful effect on the substance of the teeth ; and the ratio of the effects obtained would seem to prove that, of all the preparations employed in these, that of the tincture of the chloride of iron acts more powerfully ; the sulphate of iron next ; and the next to that again, although in comparison very immaterially, the wine of iron,—the other preparations of iron appearing to be inert.

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* *Edinburgh Medical Journal,* 1866, Vol. ii, page 631.

† The strength of the solution employed by Dr. Smith was one ounce of water to two drachms of the tincture of the chloride of iron.

At a somewhat later period Dr. J. H. McQuillen, of Philadelphia, in speaking of this preparation of iron on the teeth, stated, in an article published in the *Dental Cosmos*,* that a young lady, whose teeth, originally of excellent material, are now in the most dilapidated condition, informs me that she has taken the tincture of the muriate of iron almost daily during the last year. In her case not only the affinity between the hydrochloric or muriatic acid and the lime in the teeth has been fully demonstrated, but in addition the impropriety of an indiscriminate use of that valuable remedy. Employed, as this agent sometimes is, for a week or weeks, with the direction to 'take fifteen drops every two hours in a little water,' without any caution or corrective against its deleterious influence upon the teeth, it is no wonder that organs which are so important to health and appearance as the teeth should have their integrity seriously if not irremediably affected.

It seems unnecessary to cite any more cases, either for the purpose of showing the destructive tendency of the above-mentioned preparation of iron upon the enamel of the teeth, or that physicians are ignorant of such a condition of affairs.

It is now, I believe generally admitted by almost every one who, I might add, has had an opportunity of observing the effects, that the tincture of the chloride of iron, although passing transiently through the mouth and over the surfaces of the teeth, nevertheless exerts a most powerful and pernicious action on their structure.

Two things are essentially necessary before arriving at a satisfactory conclusion regarding the cause of this destructive action :

1. A knowledge of the quantity of the different inorganic substances contained in the enamel of the teeth.†

Phosphate of calcium, ...	87.97
Carbonate of calcium, ...	6.75
Phosphate of magnesium, ...	1.10
Organic matter, ...	1
Soda salts and fluoride of calcium, ...	2.43
	100,00

In the above analysis special attention was paid to obtain the exact quantity of the phosphate and carbonate of lime. In this respect the result of the analysis corresponds very nearly with the results obtained by Von Bibra and Hoppe Seyler. It is to be observed that in Elliott's analysis the enamel of twenty different teeth was employed.

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* "The Deleterious Effects of the Muriate of Iron on the Teeth," *Dental Cosmos*, Vol. viii, page 345.

† Quantitative Analysis of the Enamel, by A. H. Elliott, Ph.D., College of Physicians and Surgeons, New York, April, 1886

2. The composition of the tincture of the chloride of iron, —*i.e.*, the nature and quantity of the acid it contains.

The tincture of the chloride of iron is made from the liquor ferri chloridi, and contains 37.8 per cent. of the dry chloride. In making the tincture of the chloride, thirty-five parts of the liquor are added to sixty-five parts of alcohol. Attfield says that the liquor which is used in making the tincture contains much free acid, which is necessary to prevent the precipitation of the basic salts of iron. It is obvious from this that the relative proportions of the iron and the acid, whatever they may be, are adjusted very delicately, and that whenever water or any other fluid is added either to the liquor or tincture, the result is a constitutional disturbance, —*i. e.*, the affinity existing between the acid and the iron which is held in the solution is more or less disturbed according to the character of the fluid which is added.

Clinical observation shows that water increases the destructive energy of the tincture of the chloride of iron upon the structure of the teeth more than any other fluid, and, therefore, must necessarily not only cause more chemical disturbances when added to the solution, but do more injury to the teeth during the process of ingestion. As an illustration, the effect of adding water to a simple solution of the chloride of iron *devoid of free acid* is to give us basic salts of iron and the separation of free hydrochloric acid.

When a tooth is immersed in a solution of the tincture of the chloride of iron a double action takes place. First, the chlorine unites with the calcium, forming the calcium chloride; second, the carbonic acid is given off, and the hydrated peroxide* of iron is precipitated.

When a small quantity of the strong solution of the tincture of the chloride of iron (officinal strength) is placed in a test-tube and a little of the carbonate of lime is added, you will observe that there is a decided and immediate action, but no precipitation occurs. In a weak solution, however,—say one drachm of the tincture to the ounce of water,—the iron in the solution is at once precipitated. In the strong solution there is no precipitate until all the acid is neutralised by the carbonate of lime. On adding to the solution more lime, or immediately after neutralisation takes place, there is the same precipitate, viz., the hydrated peroxide of iron; and this action continues until all the iron is precipitated, carbonic acid being given off continually throughout the operation from the time the acid begins to neutralise until the last trace of the iron is precipitated. In other words, the perchloride of iron acts with the carbonate of lime precisely like an acid.

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* Synonyms: Hydrated sesquioxide of iron; ferric hydroxide.

(To be continued.)

PRACTICAL MICROSCOPY IN RELATION TO ODONTOLOGY.*

By J. W. Groves, F.R.M.S., &c.

Mr. Chairman and Gentlemen,

Some time since your President, whose absence to-night I much deplore, asked me to give you a demonstration in the method of making histological preparations of teeth, to which I gladly acceded, although I have had but little experience in this particular branch of histology, as the mode of preparing one tissue is almost identical with that used for others. The order in which I propose to treat of the various processes is that in which they are used, viz.: fixing, hardening, cutting, staining, clearing, and mounting.

So soon as a tissue is removed from the body changes commence; therefore it is important that the material should be as fresh as possible, and that it should at once be placed into a fluid which will *fix* it. The best fluids to use for this purpose are—

(1) *Osmic acid* (¼ to one per cent. solution in water.) This has but little penetrating power, therefore the material to be acted upon should be in slices of not more than ¼ inch thick.

(2) *Osmic acid*, 10 parts; *chromic acid*, 25 parts; to *water*, 100 parts.

(3) *Picric acid* (saturated solution in water). This is often spoken of as a hardening agent; it is more useful as a fixing agent, for which it is most excellent.

(4) *Silver nitrate* (½ to 3 per cent.). This is useful for fixing and also for staining. This also has but little penetrating power.

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* A paper read before the Odontological Society of Great Britain.

(5) *Gold chloride* ($\frac{1}{2}$ to 1 per cent.). This, though a splendid fixer, is more used as a stain, especially for nerve tissues.

(6) *Chromic acid* (1-6th per cent in methylated alcohol) is at once a fixing and hardening agent.

(7) *Neutral chromate of ammonia* (5 per cent. solution in water).

(8) *Picro-sulphuric acid*, made by adding 2 per cent. of of sulphuric acid to a saturated solution of picric acid in water. This must only be used if there is but very little lime present, or an insoluble precipitate will be produced.

Tissues cannot be cut in a fresh condition if thin sections are desired ; they must therefore be subjected to a process of hardening, for which purpose the most generally useful reagent is alcohol. In order to insure the tissue being equally hardened throughout, the pieces should be small and the fluid (which should be changed frequently) must be used at first dilute, then stronger and stronger until the full strength is reached.

The following is a list of the more useful *hardening agents*:

(1) *Alcohol.*

(2) *Chromic acid* ($\frac{1}{4}$ per cent).

(3) *Bichromate of potash* (2 per cent. solution in water).

(4) *Bichromate of ammonia* (2 per cent. solution in water). The bichromates penetrate better than chromic acid ; they are therefore generally preferable to it, and when chromic acid is used it is well to place the tissue at first into one of these fluids for a short time.

(5) *Muller's fluid*, composed of—bichromate of potash, 2 to 2$\frac{1}{2}$ parts ; sulphate of soda, $\frac{1}{2}$ part ; water 100 parts.

This is specially useful for nervous tissues.

As soft tissues require to be hardened, so all hard—*i.e.*, calcareous—material has to be softened, before sections can be made except by grinding. Decalcification is effected by immersion in one of the following fluids :—

(1) *Picric acid* (saturated solution).

(2) *Chromic acid* ($\frac{1}{4}$ part) ; *nitric acid* ($\frac{1}{2}$ part) ; *water* (100 parts).

(3) *Picro-nitric acid*, made of—

Water, 100 parts ; Nitric acid (25 per cent. of N_2O^5), parts ; Picric acid to saturation.

N.B.—This can be used when only very little lime is present.

It is necessary in all cases to have a considerable bulk of the hardening fluid compared with the pieces of tissue, and to change it every day for the first four or five days.

The material being now ready for sectioning, it is necessary to consider the various embedding media :—

(1) *Paraffin and lard.*
(2) *Paraffin and vaseline.*
(3) *Paraffin and chloroform.*
(4) *Wax and olive oil.*
(5) *Gum mucilage, plus a few drops of camphorated spirit.*
(6) *Gum mucilage plus syrup plus bichloride of mercury.*
(7) *Celloidin in alcohol* (absolute) *and ether.*

How to use these will be best described when treating of some of the section-cutting machines now in use.

The section may now be stained, or, if more convenient, may be placed in a preservative solution until wanted ; for this purpose the following may be used :—

(1) *Alcohol* (2 parts), *water* (1 part).
(2) *Glycerine.*
(3) *Gum Arabic, plus syrup, plus mercuric chloride,* 1-5th per cent.
(4) *Bichromate of potash,* 1 per cent.

The object to be obtained by staining is the rendering more distinct certain tissues or particular portions of cells. For staining nuclei of cells the following stains are of especial value :—

(1) *Logwood* or *hæmatoxylin.*

(a) Hæmatoxylin extract (saturated solution in *alcohol.* (*b*) *Potash alum* (saturated solution in *water* .

Add a few drops of (*a*) to (*b*), when mixed add a few crystals of *phenol.*

(2) *Borax carmine.*
 (*a*) Carmine.
 (*b*) Borax.
 (*c*) Distilled water.

Place (*a*) and (*b*) dry in a mortar and dissolve in water. Allow to stand for twenty-four hours, and then decant. This will stain in mass—*i.e.*, will penetrate well.

The next two stains, besides tingeing nuclei, also colour other parts of the sections.

(3) *Anilins* (dissolved in water).
(4) *Anilins* (dissolved in alcohol).
(5) *Osmic acid* 1 per cent.

(6) *Osmic acid*, 10 ; *chromic acid*, 25 ; *water*, 100 parts.
(5) and (6) are of marked value for selecting fat, which becomes coloured grey or black.

(7) *Silver nitrate*, ½ to 3 per cent.
(8 *Gold chloride*, ½ to 1 per cent.

(7) colours intercellular and interfibrillar cement substance brown.

(8) produces a distinct violet tint in nerves, while both (7) and (8) prevent any considerable shrinking or other alteration.

(To be continued.)

SECOND SESSION OF THE FRENCH SURGICAL CONGRESS.

On Metal Drainage Tubes of a Small Calibre for Treatment of Cysts of the Jaws.

By M. Magitot.

The origin and mode of development of cysts of the jaws, which was for so long an obscure problem, is still at the present time the subject of great controversy.

Thirteen years ago now, in 1873, I wrote a paper devoted chiefly to the study of this problem. It has since been the subject of repeated discussions both at the Société de Chirurgie, and the Société de Biologie, as well as in the medical papers.

When I made my first enquiries into this subject, and in all the controversy which has followed, I have always endeavoured to establish the theory that spontaneous cysts of the jaw owe their origin to one of the two following causes :

1st. The tooth follicle, during its embryonic stage, becomes a cyst ; its walls form the envelope of the pouch, while its contents can always be found at any period of its evolution at the bottom of the cavity. To this variety the name of follicular cyst has been given, with a sub-division into embryo-plastic, odonto-plastic, or coronary cysts, according to the stage of development of the organ enclosed in the follicle.

These names, it will be seen, correspond to those in Broca's celebrated classical description of the odontomes.

2nd. The periosteum, around the root of an adult tooth, under the influence of some inflammatory condition, becomes raised, and forms the wall of a cyst, while the end of the fang, which is denuded, partly absorbed and roughened, invariably occupies the centre and bottom of the sac.

No objection has been raised to the theory of the mode of development of *follicular* cysts, and all surgeons seem to be agreed to accept this theory, which is, moreover, well established by a number of clinical facts.

The same cannot, however, be said with regard to the second theory, the origin of the so-called *periosteal* cysts. There are many wide differences of opinion on this point. Thus Messrs. Verneuil, Reclus, and Malassey, who base their objection on the fact that the inner wall of a cyst is always lined with a layer of epithelium, decline to credit the dental periosteum with the exclusive part which I have assigned to it in my theory. They believe that the remnants of embryonic epithelium which are so frequently met with in the jaws of adults become the starting point of these cysts, and therefore call them *peridental* (Verneuil and Reclus) or *paradental* cysts (Malassey).

M. Malassey goes further still, and, in a very interesting article,* he endeavours to prove that what has hitherto been described as periosteum around the root of the teeth, is really a true ligament ; and he next proceeds to re-introduce the theory that the cysts are formed out of the epithelial débris included in the thickness of the ligament itself.

With regard to the first point, *i.e.*, the anatomical nature of the dental periosteum, I make no difficulty in conceding to M. Malassey and his splendid researches, that the so-called periosteum ought really to be included among the true ligaments, an opinion which is also held by Kölliker in Germany, and Ranvier in France. In describing this tissue in days gone by, I have myself pointed out the characters which altogether divide the dental periosteum, from the true osseous periosteum, and which would lead one to look upon alveolar periostitis as a true form of arthritis. But, while acknowledging the truth of M. Malassey's anatomical opinions, I none the less hold to my deliberate conviction that the dental ligament is the exclusive agent in the production of the so-called *periosteal* cyst, the pathology of which I have described. Do we not in morbid conditions see this ligament undergo peculiar changes in its structure, become thickened, infiltrated with sundry products, become the seat of fungous granulations, and even true tumours, and finally develop into a sort of fibrous membrane, as M. Malassey himself has acknowledged, to form a kind of closed sac around the apex of the fang. This sac is what constitutes the so-called *periosteal* cyst ; occasionally small in size and coming away entire with the tooth which bears it, sometimes of a large volume, displacing the bone in the course of its evolution, obliterating the antrum, causing a depression of a region and appearing like a true tumour.

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* On the Functions of the Paradental Epithelial Débris (Archives de Physiologie, 1885.)

On the question of pathogenesis, I disagree altogether with Messrs. Verneuil, Reclus and Malassey, and to these I may add the names of Messrs. Nepven, Jacquelin, and others also, and though this is hardly the place to begin the discussion over again, I may ask to be allowed to repeat once more my arguments in the following propositions :

1st. Every cyst which goes by the name of *periosteal*, *peri or paradental*, exclusively and invariably has its starting point in the extreme end of the fang of a tooth ; it results from a previous lesion of the organ, occasionally very remote, and it is immediately dependent upon an inflammatory exudation of fluid which raises the layer of ligamentous fibres, surrounding the end of the root which remains free in the cavity.

2nd. This mode of origin is common to the subperiosteal abscesses and cysts ; the difference between the two processes depends exclusively upon the intensity of the inflammation and on the nature of the pathological fluid, which is purulent in the one case and serous in the other.

3rd. In certain rather frequently met with conditions of periostitis circumscribed to the apex of the root, in which fluid escapes through the canal of the tooth and a penetrating caries, the retention of the secretion caused by the occlusion of the decay induces either an abscess or a cyst, circumstances which really represent cases of artificial production of the disease.

4th. No clinical fact or anatomies pathicological specimen can be brought forward to establish the origin of a cyst of this kind from epithelial débris, either within the bone or included in the thickness of the ligament. The name *paradental cyst* is therefore a wrong one.

5th. The presence of a layer of epithelium on the internal surface of the wall of a cyst is sufficiently established by the very nature of this wall. This is nothing more than the membrane surrounding a follicular sac changed into periosteum or alveolar ligament; and, as is well known, it is covered during its follicular stage with a layer of epithelium, of which remains are still to be found in the adult.

However positive and absolute these propositions may appear, I have not the slightest hesitation in repeating them, so certain am I that they cannot be disproved.

I must now hasten to the subject of treatment of cysts of the jaws.

The surgical history of cysts of the jaws may be summed up in the following words : The first form of treatment which was a standing rule in the last century and at the beginning of the present one up to the time of Dupuytren, was to remove either a part or the whole of the maxilla which had become the seat of a cyst.

A second method, followed by most surgeons of the present day, is to make a wide opening into the cystic pouch by removing a portion of the osseous wall.

I will not stop to discuss the method of total removal, which is quite out of date, and would only be necessary if at all in cases complicated with odontomes and various new growths, but I am referring here only to simple properly so-called cysts.

With regard to the method of wide openings ; though I must acknowledge that it gives excellent results, I object to it on the ground that at first it causes an unnecessary amount of mutilation, and subsequently produces more or less deformation of the region which has been operated on.

The method of metallic drainage with tubes of a small diameter is really only a reduction or simpler form of the method of extensive openings.

I have practised it now for about ten years, and I have, in this way, treated quite a large number of cysts without ever meeting with a case of recurrence.

The shrinking and cure of a cyst depend upon the following conditions :—

1st. Opening of the pouch and removal of the cystic fluid.

2nd. Removal of the solid portions contained in the cavity, such as fragments of a tooth, or of the follicle itself, in the follicular form of cyst ; removal of the tooth or root, the starting point in the periosteal cysts.

3rd. Permanent insertion of a metallic drainage tube with a wide opening in the lowest portion of the pouch, either in the wall itself of the cyst (follicular cyst), or in the alveolar cavity of the extracted tooth (periosteal cyst).

4th. Antiseptic and astringent injections, the use of caustics, if necessary, to promote the shrinking of the cavity.

All these desiderata are met by the use of the metallic drainage tubes which I now place before the members of this Congress.

These tubes are of varying thickness, but all are very narrow. The finest are not more than two millimetres wide, and are quite sufficient for the cure of a cyst of moderate size ; some are as wide as millimetres, and are suitable for more voluminous cysts.

In some cases of large cysts with thick and viscous contents, I have inserted a double drainage tube, the two tubes being of equal diameter, but of different lengths, like a pan-pipe.

As soon as this treatment has been begun, all the symptoms accompanying a cyst—such as retention of the fluid, inflammatory phenomena, swelling, or pain—disappear. These tubes are made of tin, silver, or gold, pass quite unperceived in the mouth, and the cure is merely a question of time.

SECOND SESSION OF THE FRENCH SURGICAL CONGRESS.

M. Anthelm Combe read a paper on "Catarrh of the Sinus Maxillaris and its Treatment." The following are his most important conclusions :

The only way to treat catarrh of the sinus is to trephine the cavity, insert a drainage tube of small calibre, and apply antiseptic powders after washing out the sinus. Injections through the nasal fossæ have not the slightest effect on the catarrh of the antrum. A catarrh, the first symptoms of which did not appear more than eight days before, ought to get well in a week. If the patient does not come under any form of treatment until after the lapse of two months, he ought not to expect to be cured for another two months at least. If the treatment is only begun six months after the first appearance of the disease, a cure is seldom obtained, and the patient, as a rule, is obliged to go on wearing a drainage tube.

The delay which frequently occurs in the institution of surgical measures may often be explained by errors of diagnosis on the part of the patients, or of their medical attendants. For weeks, nay, for months in some cases, the treatment followed is directed against a supposed catarrh of the Schneiderian mucous membrane. The mistake cannot always be looked upon as a culpable one, for, in many cases, the diagnosis is sometimes very difficult.

The author then mentions several cases which were diagnosed by great authorities as catarrh of the sinus, and at the operation there was no flow of liquid after the bone had been trephined. Timid patients sometimes shrink for a long time from this small operation, and regain hope at each decrease in the quantity of exuded liquid, which varies in quantity, especially in women. He gives a case in point. A woman who had been informed of the nature of the disease eight months before, only submitted to the operation nine months after the appearance of the first symptoms, and after having consulted seventeen medical men. Dr. Combé is of opinion in some cases of chronic ulceration of the turbinate bones great benefit results from injections through the trephined sinus.

Treatment: Trephining the sinus. Injection with carbolised glycerine. Insufflations of iodol powder. After the second day, the smell of "putrid fish" is no longer perceptible to the patient. On the fourth day, the matter which comes away is quite free from smell, and on the eighth day the injections are returned perfectly clear.

COCAINE, AND ITS USES IN DENTAL SURGERY.

By Eugene C. Clarke, L.D.S.R.C.S., Bangor.

Having read with considerable interest the advantage of Cocaine in Dental Surgery, I was some time ago persuaded to try its merits in performing dental operations.

I will now endeavour to illustrate to you the satisfactory results obtained in using it, which I trust may be interesting to some of your numerous readers.

The Cocaine which I prefer and find most adapted for dental use is the hydrochlorate supplied by Reynolds and Branson, of Leeds, and which is put up in small glass tubes, containing 1 gr. each; this I dilute immediately, prior to the operation, with a little tepid water, and it is then ready for use.

In extracting, I surround the tooth, when its position will allow one to do so, with a napkin, keeping the parts as dry as possible, as I find, to add to the success of the operation, that this is imperative.

I then inject hypodermically about ½ grain or a grain of Cocaine on the outer and inner side of the alveolus, immediately opposite the offending tooth, allowing three to four minutes to elapse until the parts become perfectly anæsthetised. With a warm pair of forceps, I extract the tooth. which, in the majority of cases, has been done with but very little pain indeed ; and in some cases the patients, where single rooted teeth have to be removed, scarcely knowing that the operation had been performed, and expressing their gratification at the result.

I have also observed that the after pain of extraction, which often takes place when a tooth in an acute stage of inflammation is removed, is greatly diminished by the use of cocaine.

I find cocaine most useful in removing morbid growths, lancing abscesses, obtunding sensitive dentine, and applying between the teeth previous to wedging, also where the rubber dam is used, when the gums have to be well pressed back, as is sometimes the case in deep cavities. Again, I have found it very efficacious where the pulp is to be destroyed, injecting a little and after the space of a few minutes applying arsenical dressing. I frequently do this, and, without exception, patients do not complain of any pain whatever, as the work of destruction appears to go on quietly, without causing any irritation. There are many other operations in the surgery where I find it useful, did time permit me to enumerate them all. But let this suffice ; on the whole, I consider this a valuable acquisition to our profession, and I trust that these few remarks made by me will not be out of place in these days of conservative dentistry.

I may also add that I am of opinion that half a grain or a grain in most cases is sufficient if properly applied in obtunding the pain in ordinary extractions, and in no case have I found it advisable to use more, as I consider it a drug that has to be very carefully used, according to the disposition of the patient.

THE PROGRESSIVE AND RETROGRESSIVE PHYSIOLOGICAL METAMORPHOSIS OF THE JAWS AND TEETH.—*Continued.*

By Dr. J. J. R. Patrick, Belleville, Ill.

The second bicuspid is similar to the first, only it has a more globular, thicker, and lower crown; of the two cusps the external is but little higher, yet longer, than the internal. In some cases the internal cusp is found larger, and then it is depressed in its middle, giving it the appearance of two internal cusps. The two depressions between the external and internal cusps are united by a depression which runs from the anterior to the posterior. This is formed in such a manner that the depression is circular, the outer curve directed toward the internal cusp. The root of this tooth is simple, and in length and size similar to the root of the first bicuspid. In regard to the marks of distinction between the first and second bicuspids, they are so very evident that a mistake could only occur if crowns were quite abraded by long use. Again, the crowns of these teeth are inclined backward, and are less high on their posterior part than on their anterior. These marks will serve, in connection with the stronger inward-arched external cusps, to distinguish between those of the right and the left side. Finally, the inferior bicuspids form a more gradual transition from the cuspids to the molars than their representatives of the superior set. The crown of the first inferior molar resembles an elongated right angle. It has an external, interior, anterior, posterior, and a superior surface. Being in possession of five surfaces, it follows necessarily that it has eight margins—four lateral and four superior. Of the four side surfaces which vanish inferiorly towards the neck of the tooth, the external is the most arched; the superior or masticatory surface is uneven, and is divided into five protuberances, two internal and three external, by furrows or depressions which partly intersect each other, and have an antero-posterial and an exterior to an interior direction Of these five cusps the anterior external is in a majority of instances the largest; the second is less, and the posterior one is the smallest; the two internal cusps are strong and of equal size. This tooth has seldom more than two they are very strong and compressed, flat, with their surfaces to the interior and posterior, and their margins to the anterior and exterior. The anterior one of these roots is stronger, broader, and longer, and is provided with a deeper longitudinal furrow than the posterior root. Their points are invariably curved more or less to the posterior; especially is it so with the anterior large root. Although the crown of the first molar has five cusps, which particularly distinguish it from the others, there are occasionally but four present. In such a case the crown would have no elongated but a square form of regular dimensions, with four equally large surfaces; while in those that have five cusps the external surface is always large. The second inferior molar is smaller than the first, and its regular square crown has always only four cusps—two internal and two external. With this exception, it is like the first molar of the same series. The third inferior molar usually resembles the second molar, though in some individuals it is found to be of an entirely different form; for while it usually has a regular square crown with four cusps, it is frequently seen with an elongated crown with five cusps.

Among all the teeth of the human subject, the wisdom-teeth are the only ones that have no well-defined form; and this is especially the case with the superior wisdom-teeth, for they are almost different in every mouth. Sometimes they are so small that they are scarcely the size of a pea, while the inferior ones, even in the same mouth, are of such great size, and so deformed, that they would not be taken for human teeth were they not found in the human mouth. The relative length of the crowns to that of the roots in all molars of a regular set of teeth is as 1 to 2¼ or 2½. The wisdom-teeth, however, constantly present exceptions to this rule, as in all others, by possessing, in many cases, very long or very short roots in proportion to their crowns. In the regular dental series of civilised races of men, the inferior cuspids are directed inward and backward, and the incisors vertically; the superior incisors forward, and the cuspids outward. The two series are placed on a curve in such a manner that when occlusion takes place they are partly over, partly under, and partly on each other. The rhomboid form of the superior molars is produced by the convergence of the maxillary arch, for in animals in which the arch diverges at its tuberosities, the teeth are not rhomboid in form. The molars of the inferior maxillaries have the form of an elongated right angle, and we find that the arch is divergent in the region of the molars of this series. The superior molars have three shorter roots, which give them equal power of resistance with the inferior molars' two longer roots. The bones which give support to the process of the superior maxillary are mere shells, arranged in the form of chambers, and the there roots of the superior molars diverge in the broad alveoli. On the contrary, the two longer roots of the inferior molars are slightly curved to the posterior, and compact, and the alveoli spring from a narrow but solid bone base. The roots of the inferior lateral incisors are longer than the centrals, for the reasons that they have the mental eminences for a base. The roots of the superior front incisors are longer than the lateral, and we find the nasal spine giving depth for their support. So, also, is the root of the superior cuspid longer than the inferior, and it finds room in the region of the alæ of the nose in front of the anterior wall of the antrum, the deepest and strongest portion of the alveolar process. During the age of childhood, from one to twelve years, the first and nearly the second set are completed—that is, so far as the outward forms of the second set are concerned. During the first three years of this period the teeth of the first set are formed with their alveoli. One year later, and a retrogressive metamorphosis sets in. Three years more, and the first of the permanent set appears. Gradually the deciduous teeth with their alveoli are exuviated, whence appear larger teeth, accompanied by a larger process, and the jaws become correspondingly larger. At the close of twelve years all the deciduous teeth, with their alveoli, are swept away. The period of youth continues to the age of twenty-four or five, at which time the roots and crowns of the permanent teeth are completed. From twenty-four to forty-eight, the age of manhood, the internal surface of the teeth decreases, by conversion of the formative pulp into dentine; continuing to decrease through the middle age of sixty and the advanced age of seventy, they approach the condition of solidity in the silver age of eighty-four. Beyond this period lie old age and dotage, when, if the teeth are retained, they have no internal cavity. During all these later years, the process of ossification continues—every tissue of the body becomes more condensed, the bones become firmer, the cartilages harder, and the articulations closer. All the bones of the face become thin and brittle; the foramina, which formerly gave free passage to the nutrient vessels, close. The vessels themselves become blocked up with calcareous matter, phosphates and carbonates of lime, and magnesia. Man commences in a gelatinous, and terminates in an osseous, condition. Lastly, his nerve-centres lose their activities, and he ends in mere oblivion, "sans teeth, sans eyes, sans taste, sans everything."*

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* LITERATURE.—The following are the works consulted in the composition of this essay: "Comparative Anatomy of the Teeth," by Richard Owen, F.R.S.; London, 1840-45. "Animal Kingdom," by Baron Georges Cuvier; with Additions by W. B. Carpenter, M.D., F.R.S., and J. O. Westwood, F.L.S.; London, 1863. "Comparative Anatomy," by Carl Gegenbaur; London, 1878. "Morphology of the Skull," by W. K. Parker, F.R.S., and G. T. Bettany, M.A., B.S.C.; London, 1877. "The Cat," by St. George Mivart, Ph. D., F.R.S.; New York, 1881. "Anatomy of the Mouth," by Dr. George Carabelli; Vienna, 1844. "An Anatomical Description of the Permanent Teeth," by Homer Judd, M.D., D.D.S., St. Louis, 1876.

GRIND IT OFF.—Should a devitalized tooth, after having been filled, become sore to touch, rendering occlusion of the jaws painful, there is no better remedy, says the *Southern Dental Journal*, than to grind away the tooth sufficiently to prevent occlusion. We have, in this way, several times prevented what promised to be severe periodontitis.

ALTERATION IN THE CURRICULUM FOR THE L.D.S. R.C.S. ENG.—In our correspondence column will be found an important communication from Mr. Morton Smale, Dean of the London School of Dental Surgery. It draws attention to a very important change which has just been made at the College of Surgeons. We can only express our pleasure that the much needed boon has been bestowed upon our students, and trust that it is an earnest of better things yet to come.

SULPHIDE OF CARBON FOR NEURALGIA.—After some extensive use in France rectified sulphide of carbon has been found very serviceable in certain cases of neuralgia, both dental and other forms yielding to its use. Twenty parts of carbon sulphide are dissolved in ten of essence of mentha, and the solution painted with a camel's hair brush over the painful area. The vapour is very irritating, so that it is advisable to tell the patient to close his eyes before applying the remedy, especially when the face is the seat of trouble. At first the patient complains of a sensation of extreme cold; this is, however, soon replaced by a burning heat, which, in its turn, gives place to anæsthesia over the area of application.

British Journal of Dental Science.

LONDON, NOVEMBER 15, 1886.

DENTAL DYSPEPSIA.

Although dentists are seldom consulted for trouble connected with the alimentary tract, they yet frequently have opportunities of seeing for themselves the harmful effects produced by neglect of the welfare of the teeth. The public in general, and the general run of the profession are scarcely alive to the part played by diseased teeth in producing indigestion. Where the teeth are imperfectly adapted for due mastication, it may be from one cause or another, the owner of those teeth will infallibly suffer in his health. Children who are as careless of their teeth as their parents and nurses allow them to be—and that too often is careless to the verge of utter neglect—suffer not only in their childish persons, but even pass on to adolescence harmful habits formed in early childhood. That extraordinary perversion of humanity, which plays the part of a child in this precocious nineteenth century, is seldom allowed to produce a sound set of teeth. It inherits narrow hatchet jaws and powerful large teeth which crowd out in all directions. Even the structure of these teeth is very commonly imperfect, brittle or easily prone to decay and premature shedding, the child becomes robbed of its natural provision for mastication. The diet then becomes altered ; pampering the taste perverted by its inability to chew properly does not mend matters. The food gets bolted, or improper and sloppy articles of diet entirely supersede the fitting and necessary comestibles. This goes on until assimilation becomes seriously impaired. The mucous membrane of the stomach, which flushes and grows full of blood in response to the introduction of sapid materials into the mouth, becomes irritated by the passing into the stomach of hard masses of unmasticated food, or, on the other hand, grows distended by the constant intake of watery foods. The next step is a chronic congestion, and this in its turn interferes with the due elaboration of the digestive juices of the alimentary tract, and retards or even prevents assimilation of the food. It is far easier for a child to bolt his food, and say nothing about his toothache, than to face the supposed horrors of a visit to the dentist, and all that that entails. The habit of bolting is soon acquired, and only broken after great trouble and self-control; indeed, it is very common to find "grown-ups" who can date their bolting proclivities to early formed bad habits. And children or adults, who have been fed with "slops" for any great length of time, become so inured to that kind of food that their stomach rebels against solids, and, while it finds itself quite unequal to the task of assimilating or even digesting, will throw off the food until vomiting becomes a habit. Nor are the evils more marked among children; busy men, whose teeth are sound, often, through carelessness and hurry, scarcely use them at all; the food is bolted and the teeth soon suffer alike from a proper performance of function, and as a result of chronic congestion, which attacks the mucous membrane of the alimentary tract from the lips to the stomach and intestines. In cases where the teeth are tender, or even when the tongue has grown rough on one side from unhealthy conditions of the oral lining, mastication becomes neglected altogether or is very imperfectly performed, and done almost exclusively on one side of the mouth. We no longer seize or tear our food with our teeth, but it is necessary for us to crush and grind it by lateral and to and fro movements of the maxillæ, nor can the due amount of crushing or grinding be carried out unless these actions of the jaws are efficiently performed. The presence of fetid material in the mouth, whether arising from necrosed stumps or carious teeth, is a sure cause of dyspepsia. Dental dyspepsia must be recognised and treated by the dentist. Times out of number do patients get treated by the medical advisers with bismuth, or alkalies, or what not, when a few visits to dentist would have cured the disease, and disposed of the *fons et origo mali*. The dentist is often asked to remove an aching tooth. The most casual glance at the tongue convinces him, or should do so, that not only is the aching member at fault, but that also many of its neighbours are also diseased, under these circumstances the dentist is quite justified in promising a cure of the chronic dyspepsia, if the patient will submit to the removal of the offending teeth, and their substitution by artificial ones, which will be capable of making mastication something more than an idle sham. The public need educating in this respect, and their eyes opened to the causal relationship in which bad teeth, tender teeth, edentulous jaws, and sore mouth, tongue, or gums have to dyspepsia. It is an oft-told tale, but it appears to us that it is one which cannot be pressed too strongly, or too frequently, that the real function of the dentist is to maintain the bodily health of his patient at its best, *by means of due attention to that patient's teeth.* The dentist should tend the teeth as part of the body, and with an eye upon the rest of the organism and its welfare, and should not look after the teeth to the exclusion of the rest of the structures of the body ; and until this becomes an axiom in dentistry, dentists will never rise to the right level they should occupy in the healing profession.

PRESENTATION OF THE PORTRAIT OF MR. THOMAS ROGERS TO THE ODONTOLOGICAL SOCIETY.

At the first meeting of the opening session at the Odontological Society of Great Britain, the portrait of Mr. Rogers was presented to the Society. This portrait was painted by MacCartney, and exhibited at the Royal Academy's exhibition ; it was paid for by a voluntary subscription collected among Mr. Rogers' many friends and admirers, and by them was fondly imagined to be their property until they should express a desire to present it. As a matter of fact, it appears they laboured under a delusion, for, as we are informed, the portrait was presented without the knowledge or formally expressed wish of the large body of subscribers. Alas, how vain are human expectations! One would have thought any time before the November meeting of the Odontological Society, that to subscribe to a portrait gave the subscriber, at least, a courtesy right to know how, when, and where the picture was to be disposed of. We suppose every one would feel only too gratified that the portrait in question should grace the walls of the Odontological Society's rooms, and everyone was aware that it would find its way there, like the portraits of Sir Edwin Saunders and Sir John Tomes, but we also think that some slight effort should have been made to let the subscribers know the date upon which the presentation was to be made. We can feel no animus in the matter, nor can we be accused of imputing the blame to anyone, since, owing to some extraordinary oversight somewhere, nobody seems to be responsible. As far as we can make out, every subscriber was ignorant as to the occasion upon which the portrait was to have been presented to the Society. At any rate, it appears to persons who judge business matters by the unassisted light of common sense, that a great miscarriage of the ordinary rules of plain dealing has taken place on the present occasion.

RECREATIONS AT THE DENTAL HOSPITALS.—It is with the greatest pleasure that we chronicle the successful issue of two "Smoking Concerts," one held on 10th, under the presidency of Mr. Willoughby Weiss, the president of the National Dental Hospital Students' Society; and the other, presided over by Mr. Truman, on behalf of the dental students of the London Dental Hospital. Where all is so good it is an invidious task to praise any; many of the performers are known and endeared to us by former exploits, and many more give promise of great things both now and in the future. Both concerts were really good of their kind, and afforded appreciative audiences right merry evenings.

We have so often insisted upon the necessity of cultivating the bonds of good fellowship among students, that it will be matter of no surprise to our readers to find us speaking so forcibly in favour of what some purblind teachers call "a shocking waste of time." No man wastes time if he is earnestly endeavouring to do a harmless thing well ; and to hear music, if it be good, is most harmless, at the same time that it is a direct training of the more human side of nature. If we encourage our students to work well, and, when they are not working, to play earnestly, why then, we are doing our very best for them, and if they turn out rogues, fools or charlatans so much the worse for them, it is their own fault.

Apropos of earnest playing, we learn that the students of the London Dental Hospital have determined upon the formation of an athletic club, to comprise all the games, such as cricket, football, tennis, and so on. The names of the office-bearers will, we hope, be shortly definitely settled. Among them we may expect to find Sir Edwin Saunders, Mr. Hutchinson, Dr. Walker and of course the Dean, who is usually to the fore when the interests of the students are in question. The scheme, as far as we gather, is to centralise with one large society the existing smaller societies which at present represent tennis, cricket, and so on. The number of students at present studying at the hospital certainly warrants the step that has been taken, and we have little doubt that those students who belong to the clubs of general hospitals, will see that, since they owe their professional knowledge, their experience, and therefore their success in after life, to their dental school, they should devote their energies to the newly formed club, and play their hardest for the dental eleven or dental fifteen. We shall be pleased to hear of a dental boat at Henley, for, to use a time-honoured joke, dental students ought certainly to be good "pullers."

Direct Representation of the Medical Profession on the Medical Council.—There are fourteen candidates for England, three of whom will be elected to represent the general practitioners of England; three candidates for Scotland, and four for Ireland.

For England.

D. B. Balding, F.R.C.S., Royston.
George Brown, M.R.C.S., London.
H. Bullock, F.R.C.S., Isleworth.
R. H. S. Carpenter, L.R.C.P., Stockwell.
T. M. Dolan, M.D., Durham, Halifax.
Sir W. Foster, F.R.C.P., Birmingham.
J. G. Glover, M.D., Edinburgh, London.
Prosser James, M.D., St. Andrew, London.
Edwin Morris, M.D., St. And., Spalding.
B. O'Connor, M.D., Qu. Univ. Ire., London.
B. W. Richardson, M.D., St. And., London.
R. P B. Taaffe, M.D., Lond., Brighton.
R. N. Watts, M.R.C.S., L.R.C.P., Sharnbrook.
C. G. Wheelhouse, F.R.C.S., Leeds.

For Scotland.

William Bruce, M.D., King's Col. Aber., Dingwall.
James Morton, M.D., St. And., Glasgow.
R. Sinclair, M.D., Glas., Dundee.

For Ireland.

A. H. Jacob, M.D., Trin. Coll., Dub., Dublin.
G. H. Kidd, M.D., Edin,, Dublin.
Thomas Laffan, M.R.Q.C.P.I., Cashel.
W. R. McMordie, M.D., Qu. Univ., Ire., Belfast.

Abstracts of British & Foreign Journals.

THE DENTAL REGISTER.

DEAFNESS CURED BY EXCISION OF TONSILS.

By J. N. Martin, M.D., Lecturer on Oral Diseases, Dental Department, in University of Michigan.

The close relation is insisted upon which exists between the tonsils and jaws and their appendages; the jaws, etc., and the ear.

It is a well-known fact by aurists that many so-called diseases of the ear come from diseases of the oral structures, and are really symptoms and signs of disease in other localities; diseases of the oral structures by reflex action often produce otalgia or ear-ache. Cases illustrating this are cited.

Patient, Mr. D., aged 22, came for treatment, April 6, 1886, for "throat trouble."

As long as patient could remember he had been afflicted with "ear trouble;" all of the time his hearing was somewhat impaired, but at times much worse; he had had attacks of "sore throat" frequently during this time, and not infrequently tonsillitis; his hearing always more impaired, while his throat was sore; and generally ear-ache accompanied these attacks of sore throat. His general health had always been good.

When patient applied for treatment an examination revealed acute pharyngitis and some inflammation of the tonsils; tonsils somewhat swollen, one greatly hypertrophied and the other somewhat so. The throat was treated for some time, when, the acute inflammation having disappeared, excision of the tonsils was advised, as it was thought that their hypertrophied condition was the cause, as well as the result, of the repeated attacks of tonsillitis and pharyngitis; *also that the swelling and thickening of the tissues about the openings of the Eustachian tubes, resulting from these inflammations, is a fruitful cause of impairment of the aural organs.*

Both tonsils were removed April 17, and patient's hearing was improved within a few hours; two weeks later his hearing was nearly perfect; on June 7, 1886, his hearing was perfect and throat perfectly well, without an attack of sore throat since the operation.

DENTAL COSMOS.

MOVING INDIVIDUAL TEETH.

By Eugene S. Talbot, M.D., D.D.S., Chicago.

To force out central and lateral incisors, he surrounds the tooth to be moved, and around the molars, as nearly opposite the direction the incisor has to travel. Fit platinum collars, solder cups upon the collars directly opposite, and in line. Make a spring of piano wire, and spring it into the cups soldered upon the collars.

Another method is to make a plate to fit the teeth, thickening it nearly to the cutting edge of the tooth to be moved, and drilling a hole through the thickened part. Directly opposite, at some convenient point on the back part of the plate, drill another hole just deep enough to hold the spring, and put the spring in place. If the hole in the thickened part is drilled in the proper place, the end of the spring will hit the tooth midway between its cutting edge and the margin of the gum. The spring is very effective. The pressure is constant, and it is readily removed for adjustment or for any other purpose.

Literary Notices and Selections.

POST-GRADUATE STUDY.

By J. D. Moody, D.D.S., Mendota, Ill.

> "A college training is an excellent thing: but, after all, the better part of a man's education is that which he gives himself."
>
> James Russell Lowell.

I propose making this sentiment the key note of my paper. On two former occasions I have presented the subject of dental education,* and my intention is to take up at this time only one phase of this question, that of post-graduate study; to show its need, to outline a scheme of study, and to devise a plan for carrying it out. I believe that there is not a gentleman present who does not realise that some further elaboration of our educational scheme is, to say the least, desirable. Very many there are who think it imperative. To those who care nothing for a true scientific culture, and to whom the proper insertion of a beautiful filling or of an artistic denture is the *ultima Thule* of dental ambition, this paper will have no interest. But to those who are longing for something better in themselves or in the general profession, something which "will foster in us that spirit of broad and liberal thinking which is the essence of true scientific culture," to them I offer these suggestions as a partial solution of the question.

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* Ohio State Journal of Dental Science, July, 1883. President's Address before the Central Illinois Dental Society, October, 1885.

A physician is reported as having recently said that the practice of medicine in the near future is to be largely hygienic and sanitary, rather than one of drug prescribing. This may be rather a rosy view of the case, and yet it contains some truth ; and while in all probability we will never get beyond the necessity of tooth filling, the time is surely coming when the dental surgeon will be assigned the lower seat and the dental doctor will be given the higher one. But before this time comes there must come a change in our educational methods. In a late number of the *Medical Record* there is an editorial on "Practicality in Medicine," in which the writer warns the profession against going to the extreme in making theory secondary to the practical, and uses the following language : "In our anxiety about the superstructure are we not getting careless about the foundations ?" May not this apply as well to ourselves ? Do we as dentists possess the foundation principles upon which to build a truly scientific superstructure ? They are not to be found in the curriculum of any college. Even did they exist there, the usual two years course would be too short a time for their proper study. Three years would not give time enough. The mind of the average matriculate is not sufficiently matured to carry on such work. A young man destined for the ministry passes through the high school, then four years of college, and finally three years of seminary work. Can we be contented with anything less ? As I shall show farther on, the list of subjects upon which every intelligent dentist should be fairly well informed, is far greater than any present college curriculum, and greater than under present circumstances it is possible to embrace in college work. A man cannot well remain in school long enough to gain that knowledge upon which to build great scientific laws, and it is folly to expect the student to pursue them beyond college life without some other incentive than the mere acquisition of knowledge. Of course there are men here and there, who can, by sheer force of will, accomplish this, but our aim should be to raise the profession as a whole to this high standard. How then are these foundation principles to be acquired ? It must be by a life of study. A man can hardly begin serious work before the age of forty. He is then just in his prime, and, if the proper foundations have been laid, he is in a position to begin original work and render valuable service to his profession and to the world.

Are we, as dentists, making the most of our privileges? It seems to me that we are not; for, in glancing over the files of dental journals for ten years past, I was struck with the fact that so few new names have come to the front. You could almost count them on the fingers of your hands. Perhaps our profession stands as well as others in this regard, but I am sure this is not as it should be. In this country there are from fifteen to twenty thousand dentists. We can just as well be a generation of dental scientists as a generation of dental shopkeepers; but this will depend upon whether we lay the proper foundations. But about these foundations. Let me quote the opening paragraph of a paper read by Dr. Williams before the First District Dental Society of New York. He says: "I am sure you will rightly apprehend me when I say that the daily routine of details which goes to make up the practice of our specialty is not calculated to foster in us that spirit of broad and liberal thinking which is the essence of true scientific culture, and that it is therefore good for us to occasionally go back to a consideration of those *first principles, which are the foundations of all specialties.*"† The italics are mine. And this paragraph from Lionel Beale. "The observer who aims at studying the remarkable and highly interesting phenomena of germination, growth, and multiplication of the bioplasm of cells or elementary parts, in the tissues and organs of man in health and disease, will find it advantageous first to investigate those processes in the simplest living beings, where they occur under conditions less complex. * * * * The observer will learn many most important facts by watching the germination of the common mildew, and studying the different appearances of the plant when developed under different circumstances. * * * * The mode of origin and multiplication of a bacterium and the growth of a spongiole of a plant may appear to be questions far indeed removed from the province of medical inquiry, and yet, we shall find that by such investigations only can we hope to determine the nature of some phenomena, the true explanation of which lies at the very root of a knowledge of the real nature of the disease. * * * * Let not the student of medicine, therefore, conclude that the multiplication and growth of the lower forms of animal and vegetable life are not in his province. *There is, indeed, scarcely a department of natural knowledge which does not bear more or less directly*

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† Cosmos, March, 1885, page 129.

upon medicine."* Again the italics are mine. If this is true of the student of medicine, how much more is it true of the student of dentistry. Now what are these "first principles" to which Dr. Williams alluded?

Taking up his article, "Molecular Structure and Force with Reference to Nutrition," it will be seen that to read it understandingly it will be necessary for us to have a fair knowledge of the theory of molecular dynamics, also of chemistry, inorganic, and the more complex organic, and of chemical physics. Truly that is getting down to first principles. And how about the statement of Lionel Beale? "Just what shall be the scope of these studies of ours; in what department of natural knowledge?" I answer, in every thing that in any way bears upon the life history of organised matter.

Let us take a look through the library, and see whether this statement is too sweeping. I select a book here and there indiscriminately. First I take up some volumes of the "Independent Practitioner," containing articles on micro-organisms, by Dr. Miller. These theories and facts are of the utmost value to the dentist, but to thoroughly understand them we must be acquainted with all the teachings of microscopy and of bacteriology, and this latter must be based upon a previous knowledge of vegetable morphology and physiology and cellular metabolism, and this latter again upon molecular physics. Also a knowledge of chemistry and of chemical physics will be needed, and of animal anatomy and physiology as well. The little work on "Formation of Poisons," by Dr. Black, will require an equal range of knowledge on the part of the reader. Take up Foster's Physiology, or turn to the article on Physiology by Foster in the "Encyclopædia Britannica." To read these intelligently all of the above quoted studies must be thoroughly in mind, and in addition will be needed a knowledge of the lower forms of vegetable and animal life and of electricity. Here is a volume of the "Dental Register" for 1885. I turn to an article by Dr. Frank Abbot, on "Microscopical Studies upon Absorption of the Roots of Temporary Teeth." On attempting to read it, it will be found that we will need microscopical experience of no mean order, indeed of the very best, as also a knowledge of chemistry, cell metabolism, histology, and anatomy. Next I pick up a little pamphlet published by Dr. Barrett, of Buffalo, on "Nervous Force, Its Origin and Physiology." This is a subject with which we have much to do, and to have a good understanding of this article we must be at home in molecular physics, chemistry, anatomy, physiology, and histology. Take down the last volume of "The Reference Handbook of Medical Sciences," turn to the article "Endothelium," and see how our previous teachings have been at fault, based as they were upon erroneous deductions drawn from imperfect embryological investigations. With the development of the dental tissues, at least, we ought to be familiar. Dr. Atkinson has well said, "Direct interrogation of nature through embryological investigation to get at physiological changes, and examination of specimens under the microscope of tissues affected by diseased action, form the only possible way to arrive at a discriminative ability that will at all meet the demands of a high ambition to know."

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* The Microscope in Medicine, London, 4th ed., pages 135-6.

Look through the files of the "Cosmos," or other dental journals, or of any medical journal, and notice the articles on nutrition, embryology, development, metallurgy, chemistry, etc., etc. It will require a high order of mental culture to be able to read them with ease and profit. Do you not see that Lionel Beale's statement, previously quoted—"There is, indeed, scarcely a department of natural knowledge which does not bear more or less directly upon medicine," etc.—is not too broad in its claim?

On every commencement day the advice is given to the graduates to keep apace with the current literature of their profession. It is good advice, but can be only partially followed out, for, as a rule, the graduates do not have the preliminary knowledge to enable them to grasp in detail a large part of it.

I believe that, on an average, graduates are about twenty-five years old. At forty the man is in his prime; his intellectual faculties and his physical being are at their best. Could the spare moments of these intervening fifteen years be devoted to systematic study, they would fit the man at forty or forty-five to grasp the great problems confronting the profession, with an intelligent energy that would surely be productive of great results. The ripened years from forty to sixty-five, devoted to research, would lift the dental surgeon to the rank of a dental scientist. According to this plan, college life would be but a preparation of the ground for foundation building. From twenty-five to forty, the foundations would be in process of laying, and the superstructure erected in the afternoon of life.

But just what lines of study should be taken up in this work? To get at the more advanced thought in this direction, I addressed letters to several of the most widely known educators in the dental profession outside of our own state, asking them to outline briefly a plan of post-graduate study, "such as would be required to make a thoroughly scientific dentist." The burden of each reply was, more study. I quote from some of them to let you see what others are thinking about this matter. Dr. Barrett says: "There are many of the medical branches that are closely connected with the practice of dentistry. A graduate from a dental college should comprehend them, but his knowledge must be obtained by after study, as they are not in the dental curriculum." He enumerates advanced work in microscopy and histology, practical and experimental physiology. He further says: "In natural physics no one should neglect the study of the Forces. The Conservation and Correlation of Force should be carefully studied. Then the student is ready to take up Tyndall's Floating Matter in the Air, and Magnin's Bacteriology, without a study of which, one is not prepared to comprehend general physics." Dr. Wm. H. Atkinson, whose suggestions always carry great weight, writes me (in addition to the sentence previously quoted), the following, to which I desire to call especial attention. "I know of no dental college, and for that matter, of no medical college, that so instructs its matriculates as to make them possessors of even the alphabet of the molecular changes through which elemental substances pass in the production and maintenance of functioning bodies liable to the manifold activity, known as weakness and disease." Also the following sentence: "It is almost daily experience that the present demand of really earnest young men is for that which cannot be found without very extensive reading of text-books and journals, and a long series of observations in practical studies, whereby they may become masters of diagnosis, prognosis, and prescription.

Dr. Frank Abbott, Dean of the New York College of Dentistry, who knows from experience how difficult it is to raise the standard of dental education, fears he may be considered extravagant in only demanding a thorough knowledge of anatomy and surgical anatomy of the head and face, the microscopical study of the teeth, their surroundings, and the pulp in health and disease, embryology, certainly as far as the development of the teeth are concerned, etc.

Dr. Taft, who, as teacher, editor, and author, is so well qualified to speak authoritatively, says, "The ordinary graduate usually has only a foundation upon which to build; most of the studies should be pursued much further than is required for graduation, and some branches that are not required at all should be taken up and studied. . . . . . Gynæcology, also, should be more thoroughly studied; also comparative odontology. A far more extensive study of oral pathology and surgery should be required." And then he makes a suggestion in regard to advanced study, which I will only mention, as it is foreign to the thought I desire to develop; and yet I think it is a very important one indeed, and worthy of careful consideration by thinking men. His idea is to arrange an advanced course, embracing four years of study and work. Those entering upon it would have it in view from the beginning; their work would be more thorough than that of the student competing for the D.D.S. Then, when this has been fully accomplished, he would recognise it by conferring the degree of *Master of Dental Surgery.* This plan is worthy of a paper itself. But I recognise the difficulty of inducing any large number to enter upon this extended and expensive course of study. So long as one can graduate in two years and stand on the same legal footing with others, there will be a difficulty in securing students for the advanced course. But, further than this, there are, at present, hundreds in the profession who feel the need of just such work, but to whom it would be impossible to close up business for four years to enter upon such study. It is to this large class that my plan would be especially applicable.

But about the special studies. Out of my own experience in study, and from long thinking on the subject, I have arranged the following schemes of studies. I would have them follow each other in about the order named, and preferably pursuing only one study at a time.

Physics, molecular.
 mechanical movements.
Electricity, magnetism.
Chemistry, inorganic.
 organic.
 chemical physics.
Metallurgy.
Microscopy, technical.
Zoology, invertebrate, morphology.
Botany, systematic.
Anatomy, human.
 comparative.

Embryology.
Odontology, comparative.
Histology, vegetable.
  animal.
Physiology, vegetable.
  animal.
  chemical.
Bacteriology.
Pathology, general.
  dental.

You will notice that I have not included in this list special diseases or remedies, and general knowledge has not been considered at all. Further, you will notice that each study follows logically upon the one which precedes it. I do not expect that any one would master these subjects in the allotted fifteen years. I would only expect a working knowledge of these to be obtained in that time. The best use to make of a library is not to sit down and try to master its contents, but to find out what information it contains, and where and how to obtain that information when wanted for use.

At forty or forty-five, I should expect a man to have a good working knowledge of these subjects, and in all probability to have developed an inclination in some one direction of study; and then, and only then, would he be in a position to attempt real work or to have an intelligent understanding of such work when presented to him.

I do not see how any one study in this scheme can be left out, but I want to call especial attention to organic chemistry, as of vital importance to us, and yet hardly touched upon in college work; the same can also be said of chemical physiology. Bacteriology, too, which underlies the very foundations of dental pathology, has not received the attention it merits, and, without radical changes in our methods of teaching, cannot be properly taught in our schools.

I have only included in this list those branches, a knowlenge of which it will be necessary for us to obtain, in order that we may have anything like an idea of the basal principles upon which our profession rests, and without which we cannot hope to grasp the meaning of, much less formulate, great scientific laws. A man may fill a tooth or treat an abscess without having acquired all this information, but without it his treatment is largely empirical. When the mass of the profession come to lay these solid foundations, a long stride will have been taken towards lifting our practice out of the empirical into the scientific.

(To be continued.)

Reports of Societies.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary Monthly Meeting, June 7th 1886. George Gregson, M.R.C.S., and L.D.S. Eng., *Vice-President, in the Chair.*

The minutes of the previous meeting having been read and confirmed,

The following gentlemen signed the Obligation Book, and were formally admitted to membership, viz. :—

Messrs. C. M. Bayfield, Murray Davis, A. E. Clayton Woodhouse, Geo. G. Campion.

The Librarian (Mr. Weiss) announced the following additions to the library :—Official Year Book of Scientific and Learned Societies for 1886 ; the recent issues of the Scientific Proceedings and Transactions of the Royal Dublin Society ; and some missing back numbers of the *Independent Practitioner*, making the file of that journal complete up to date.

The Curator (Mr. Storer Bennett) exhibited a model which had been presented to the Museum by Mr. Wilson, of Edinburgh, showing three bicuspids on each side of the lower jaw. The patient's dentition had at first been normal, but both the lower first molars having to be extracted, the space on the right side was soon occupied by a supernumerary bicuspid, whilst on the left side the second molar came forward and closed the gap. Some years later this tooth also had to be extracted, and within a few months its place was taken by another extra bicuspid. The extracted molars were large and had well-developed roots. The patient had also on each side of the upper jaw a small supernumerary tooth situated between and outside of the first and second molars.

Dr. St. George Elliott showed several forms of Bunsen burner adapted for different dental purposes. One with a very short tube he used for annealing gold ; another, with a detachable tube to facilitate cleaning, he used for waxing up; whilst a third could be used either as a Bunsen or as an ordinary burner, and was adapted for the blow-pipe.

Dr. Elliott also showed some nerve drills of his own make. He found it convenient to have three sizes of these, instead of the one usually sold. They were made with triangular corrugated points, and could be easily sharpened on a common oilstone.

He also showed, *apropos* of the discussion which had recently taken place in the dental journals with reference to the invention of the dental engine, the flexible drill made of coiled wire invented by Mr. Jas. Naysmith and the flexible cable supplied with the S.S. White engines, and pointed out that the former would be quite useless for dental purposes on account of the amount of " back-lash."

Lastly, Dr. Elliott invited the members to pay him a visit any day after 5 p.m. to inspect his arrangement for working his dental engine, lathes, &c., by means of a one-horse power Otto gas engine. The engine was placed at some distance from his operating room, the power being transmitted by means of a band running under the floor. It was easily controlled by means of a small lever pressed by the foot. The consumption of gas was about five cubit feet per hour, and the cost therefore about a farthing an hour.

Mr. Brunton (Leeds) showed an adaptation of the dental engine designed for the benefit of those who suffer from " dentist's leg." The engine was of the Bonwill type, the arm from shoulder to elbow being 24 inches long; to this was attached an S.S. White cable. The engine being placed at the back of the operating chair, the cable is brought round the left side of the patient. The operator could sit at his work and drive with either right or left foot at will.

He showed the syringe which he used for injecting cocaine before the extraction of molar or bicuspid teeth, and stated that for some two months past he had been using a solution of benzoate of cocaine, and found that it was quite free from the tendency to decomposition which was met with in other solutions of this alkaloid. He had used it in between forty and fifty cases, and had not yet met with any in which sickness or other unpleasant symptoms had occurred.

In reply to questions from Messrs. Storer Bennett and Walter Coffin, Mr. Brunton replied that the solution of benzoate of cocaine seemed to be perfectly stable and capable of being kept unchanged for an indefinite time. Mr. Branson, the chemist, of Leeds, who had submitted it to various tests, had so assured him, and his own experience went to confirm the truth of the statement. As to the amount, he had several times injected from 2½ grains to 3 grains without any unpleasant results following, and in one case he had injected as much as 9 grains at one sitting, and extracted ten teeth. This patient was much addicted to alcohol, which might possibly have rendered him less susceptible to the influence of cocaine. He found that the local effect of the injection usually passed off in about ten minutes.

Mr. Brunton then showed a clamp and matrix which he had made and used in 1871, and had since exhibited at some of the meetings of the British Dental Association. It was identical with one figured in the *Cosmos* for May as something new. Finding, however, that its range of usefulness was limited, he constructed a matrix with the ends bent back, and which was held in position by an ordinary molar rubber dam clamp. This was shown at the Leeds and Plymouth meetings of the British Dental Association, and figured in a paper by Mr. Ladmore which appeared in the Journal of the Association for June. Mr. Brunton handed round specimens of this matrix and of two others, also described in Mr. Ladmore's paper, one of which was secured on the tooth by means of a through bar, which was tightened by means of a key.

Mr. W. E. Harding, of Shrewsbury, exhibited and presented to the museum the calcified but necrosed crowns of a right upper second bicuspid and first permanent molar, which he had removed from the mouth of a boy aged five-and-a-half years. The necrosis was the result of a chronic abscess connected with the deciduous molar which had been extracted by a medical man six months before Mr. Harding saw the case, but only after the abscess had been discharging some twelve months. The case showed the injury which might be caused to the undeveloped permanent teeth by abscess connected with the deciduous teeth.

Mr. Hunt (Yeovil) showed models of the upper jaw of a boy, aged sixteen, who had consulted him some time since on account of his central incisors, which were very large and a great disfigurement. He wished to have them extracted and replaced by substitutes, but Mr. Hunt dissuaded him. Subsequently one of them became carious and painful; it was extracted by a medical practitioner, and a short time afterwards a very good well-shaped central appeared in its place. Mr. Hunt then removed its fellow, in the hope that the same result might follow.

He was sorry he had not been present at the previous meeting when the subject of Cocaine was brought forward, but as it had been referred to again that evening by Mr. Brunton, he would briefly give his experience. He had used it pretty extensively by injection since November, and with very satisfactory results ; but in order to get satisfactory results certain points must be attended to. Owing to the density of the gum tissue, it was not very easy to inject the solution properly ; the instrument must be inserted deeply, the solution injected slowly, and the needle left in the wound for a short time. If removed at once a considerable portion of the solution would escape by the puncture. Occasionally it would find its way into a fistulous track and escape in that way, or, in the lower jaw, if the needle was not inserted quite vertically, it might transfix the gum, and the solution would be injected into the floor of the mouth. In such cases the absence of the usual resistance when the fluid was injected would make the operator suspect something wrong. Excluding such accidents as these, he found that he obtained very definite and satisfactory results. Ordinarily he found one grain sufficient ; in only three cases had he found it necessary to exceed this amount, and he had never used more than a grain and a half, but he had not yet been called upon to operate on a bibulous patient.

The Secretary showed a geminated right upper lateral and supernumerary tooth, extracted from the mouth of a boy eight years of age by Mr. J. B. Bridgman, of Norwich. It occupied the space between the permanent central and first temporary molar, and the permanent lateral was just appearing behind it. Mr. Bridgman presented the specimen to the Museum.

Mr. Hepburn showed a specimen of osseous union of two molar teeth sent by Mr. Tod, of Brighton, but without any particulars respecting the case.

The Chairman then called upon Mr. J. W. Groves to read the paper of the evening on "Practical Microscopy in its application to Odontology." [*See page* 1030.]

NATIONAL DENTAL HOSPITAL STUDENTS' SOCIETY.

Ordinary Meeting, Nov. 5, 1886, H. G. Read, Esq. (*Vice-President*) *in the chair.*

The minutes of the previous meeting were read and confirmed.

Messrs. Fogg, Pedler and Ruston were balloted for and elected members of the Society.

Casual communications were brought forward by Mr. Carter, who read notes of a case of a large alveolar abscess. Mr. Morgan Hughes showed a wisdom tooth which had been the cause of trismus for twelve months, the removal of which brought about relief. Mr. Fripp also showed a lower wisdom tooth which had given a great deal of pain, and when split open showed a large amount of calcification in the pulp. Mr. Humby showed models of a case of abrasion. Mr. Minnett showed a bificated lower canine and two four rooted upper molars. The Vice-president then called upon Mr. Jones for his paper on Amalgams. An animated discussion ensued, in which Messrs. Read, Giddes, Humby, Hughes, Penrose, Fripp and Knight took part.

A vote of thanks was then accorded to those gentlemen who had brought forward casual communications, and to Mr. Jones for his paper, and the meeting was adjourned till Friday, Dec. 13.

Dental News.

EXAMINATION PAPERS SET AT THE EXAMINATION FOR THE DIPLOMA IN DENTAL SURGERY AT THE ROYAL COLLEGE OF SURGEONS OF ENGLAND, NOVEMBER, 1, 1886.

Anatomy and Physiology and Surgery.

I. Describe the relations of the Submaxillary Gland.

II. Mention the nerves which are distributed to the Tongue, Jaws, and Palate. Give their several functions.

Surgery and Pathology.

III. What are the peculiarities of the teeth, met with in the subjects of inherited syphilis? Distinguish between those of the first set and those of the second set.

IV. Describe the principal morbid conditions which may affect the gums.

EVENING PAPER.

Dental Anatomy and Physiology.

I. Describe the dentition of ruminants, mentioning any salient characteristics in the articulation, muscles, mastication, and salivary glands.

II. From what tissues are teeth derived? Give examples of correlation of growth between skin, hair, and teeth.

III. Describe the stellate reticulum of the enamel-organ. What part does it play in the development of enamel.

Dental Surgery and Pathology.

I. What dental irregularities are frequently inherited? How far does this affect their treatment?

II. What are the causes of excessive sensibility of the dentine? By what means can it be modified?

III. Enumerate the substances used for taking impressions of the mouth. Describe the methods of using them, and their respective advantages.

Pass List of the Royal College of Surgeons of England.—The following gentlemen, having passed the necessary examinations, were admitted Licentiates of the College in Dental Surgery, at a meeting of the Board of Examiners, on Nov. 3.

J. S. Acton, Barnes Common; J. P. Smith, Chelsea; H. Williams, West Kensington, and J. A. S. Tibbs, Brighton, of Middlesex Hospital; A. E. Baker, Oakley Square; A. T. Croucher, Clapham Road; A. Kendrick, St. John's Wood; F. M. Ludbrooke, West Brompton; H. J. Moore; and J. Woodhouse, Oakley Square, of Charing Cross Hospital; C. A. Pattison, 1 Highgate, of Westminster Hospital.

Four candidates were referred.

Pass List of the Royal College of Surgeons of Edinburgh.—At the October sittings of the Examiners, Mr. Alfred Stevens, London, passed the first professional examination for the License in Dental Surgery ; and the following gentlemen passed the final examination and were admitted L.D.S. Edinburgh :—

William John Fisk, Brixton ; Arthur Farish Benson, Yeovil; Arthur Cocker, Yorkshire, and Charles Maclean Cunningham, Leith.

HOSPITAL REPORTS.

Monthly Statement of operations performed at the London Dental Hospital, Leicester Square, from Oct. 1 to 31, 1886 :—

Number of Patients attended		2710
Extractions	Children under 14	443
	Adults	909
	Under Nitrous Oxide	681
Gold Stoppings		254
Other Stoppings		826
Advice and Scaling		146
Irregularities of the teeth		93
Miscellaneous		430
Total		3782

Monthly Statement of operations performed at the National Dental Hospital, from Oct 1 to Oct. 30, 1886 :—

Number of Patients attended		1953
Extractions	Children under 14	466
	Adults	690
	Under Nitrous Oxide	689
Gold Stoppings		57
Other Stoppings		752
Advice and Scaling		320
Irregularities of the Teeth		193
Miscellaneous		185
Total		3352

Isidore Fred. Prager, L.D.S.
House Surgeon.

Work done at the Victoria Hospital of Manchester, during the month of October, 1886 :—

Number of Patients attended		1051
Extractions	Children under 14	891
	Adults	
	Under Nitrous Oxide	12
	Chloroform	1
	Cocaine	23
Gold Stoppings		50
Other Stoppings		68
Miscellaneous		320
	Total	1365

HENRY L. KNOOP, *Hon Secretary*

MONTHLY STATEMENT of operations performed at the Dental Hospital, Birmingham, from Oct. 1 to Oct. 30, 1886 :—

Number of Patients attended		1015
Extractions	Children under 14	850
	Adults	
	Under Nitrous Oxide	28
Gold Stoppings		6
Other Stoppings		57
Advice and Scaling		85
Irregularities of the teeth		2
Miscellaneous		50
	Total	1088

W. PALETHORPE, L.D.S., Eng,, *House Surgeon.*

Correspondence.

To the Editor of the "British Journal of Dental Science."

Sir,—Will you allow me to call special attention to the new regulation of the College of Surgeons, with regard to the three years instruction in Mechanical Dentistry.

In future, one half of that time may be taken before Registration. Candidates, therefore, who were apprenticed before passing a preliminary examination can now have eighteen months of such work recognised as part of the Curriculum.

This in no way affects the period of four years professional work required subsequent to Registration, which will still be required of all Students.

We owe a distinct debt of gratitude to the Dental Board, and the Council of the Royal College of Surgeons for this very liberal concession. Your obedient servant,

MORTON SMALE, *Dean.*

DENTAL HOSPITAL OF LONDON AND
LONDON SCHOOL OF DENTAL SURGERY,
LEICESTER SQUARE, W.C.
November 12th, 1886.

British Journal of Dental Science.

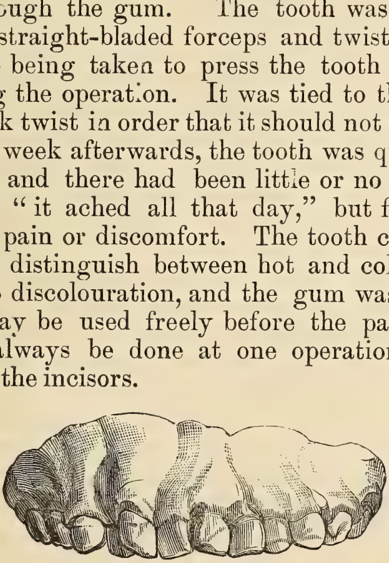
No. 453. LONDON, DEC. 1, 1886. Vol. XXIX.

CASES OF INTEREST IN THE DENTAL DEPARTMENT OF WESTMINSTER HOSPITAL.

By Morton Smale, M.R.C.S., Eng., L.D.S., *Dean of the London School of Dental Surgery.*

Case 1.—W. T—, æ. 8, applied to have an upper front tooth twisted. On examination ,he was found to have the right upper front incisor well erupted, but the mesial edge, instead of the labial surface presenting towards the lip. The left upper front incisor was erupting very slowly, and had hardly appeared through the gum. The tooth was grasped firmly by a pair of straight-bladed forceps and twisted into a good position, care being taken to press the tooth firmly into the socket during the operation. It was tied to the surrounding teeth with silk twist in order that it should not return to its old position. A week afterwards, the tooth was quite firm in the new position, and there had been little or no inconvenience. The boy said "it ached all that day," but from that time there was no pain or discomfort. The tooth could be tapped. and he could distinguish between hot and cold applications. There was no discolouration, and the gum was quite healthy.

Torsion may be used freely before the patient is twelve, and should always be done at one operation. It is only applicable to the incisors.



Case 2.—The above woodcut represents the mouth of a child who presented himself at the Westminster hospital; and is interesting from a comparative odontological point. It will be seen

that the patient has the full typical mammalian dentition with gard to the incisors, the formula for which is $\frac{I}{3}\,\frac{C}{1}\,\frac{PM}{4}\,\frac{M}{2}$, the ordinary dentition (deciduous) in man being $\frac{I}{2}\,\frac{C}{1}\,\frac{PM}{0}\,\frac{M}{2}$. Which of the incisors is usually suppressed ; is it I_2 or I_3? Authorities differ, the majority agreeing that it is I_3. This case appears to support Professor Turner's opinion that it is I_2 for this reason : I_2 is as large or larger than I, while I_3 is about the usual size and shape of an ordinary lateral incisor. To support his view he refers to a large number of cleft palate cases accompanied by fissure through the alveolar border, and he has found that usuallya tooth is suppressed in these cases, and that generally it is I_2, I_3 persisting and being found approximating to the canine. He further considers that the alveolar suture is in the substance of one of the premaxillæ, and not at the suture between the maxilla and premaxilla situated just at the position that I_2, would occupy. In this view he is supported by Dr. Albrecht. It appears very conclusive that in man it is I_2 that is suppressed, and that in this mouth it is I_2 that is the extra tooth, not I_3.

CASES 3 and 4. *Imperfect articulation.*—Two cases have have been recently sent to the Dental Department in order that obturators might be made for cleft palate, and in each case, on examination, there was found to be no cleft. The arch in the first case was abnormally high, but in the second it was quite ordinary. Nevertheless, in both cases the articulation was of that peculiar nasal character that always accompanies fissure of hard or soft palate.

In the first case it was considered that the manner of speech might be due to the abnormal height of palate, and an artificial one was made with no good result. Some trouble was then taken to make the patient pronounce each syllable of a word separately and distinctly, and then slowly to repeat the whole word together. This was accomplished with several polysyllabic words, forcing the conclusion that the cause of the defect was that as a child he had been allowed to pronounce words in what parents fondly call "a childish way," instead of being made to enunciate properly, and that the habit had grown with the child until, when he presented himself at the hospital, he was seventeen. Satisfactory proof having been given that he could pronounce properly he was told to go home and break himself of the habit, and his mother was instructed to give him no food until he asked for it with perfect articulation. The boy was anxious to be cured, but found sixteen years' bad habit an exceedingly difficult thing to overcome. By dint, however, of hard practice and perseverance he almost entirely conquered the habit during the next six months, though directly he talked quickly or without circumspection he invariably reverted to the old manner of speech.

The second case was more difficult, as the patient had reached the age of twenty-five, and no amount of showing would convince him that he could do better if he pleased. He wanted something done in the "miracle way" that would cure him at once, and he would not take the trouble to cure himself. He would have been a good case for "faith healing."

Case 5. *Alveolar abscess.*—E. G— came to the hospital with an enormously swollen face. The pus had infiltrated the whole of the areolar tissue of the cheek, closing the eye, and spreading down into the neck. On looking into the mouth the fangs of the second lower molar were found to be the cause. These, after some difficulty, the patient allowed to be removed, a free flow of pus, and permanent relief following. The difficulty the patient made was that his doctor had told him that he must not have the tooth removed while the inflammation continued. It is to be hoped that this old error is exploded. An offending tooth should be removed, notwithstanding the inflammation, at once, and no amount of swelling should prevent this being done. This case is reported solely to call attention to this fact, difficulty so often arising at the hospital from the patient having been told *not* to have the tooth removed while the face is swollen.

Cocaine in dentistry.—This new drug, so useful in ophthalmic surgery, is not altogether useless in dentistry. Crystals of the citrate are perhaps the most useful, but a 50 per cent. solution of the alkaloid is very good.

Its main uses are as follows :

In extraction, if the drug is applied to the gums surrounding the tooth (the part having first been dried and protected from the saliva or the cocaine will be washed away), the pain attending the adjustment of the forceps is obviated, but the wrench attending the fracture of the outer wall of the alveolus and rupture of vessels and nerves at the apical foramen is much the same. A small loose stump may be removed almost painlessly.

In cases of fractured teeth, where it is necessary to remove the pulp, cocaine is also useful. Applied to the surface of the exposed pulp it will deaden the sensibility, and if applied several times at short intervals the nerve extractor can be passed up the tooth, and the pulp extracted at once with very little pain. Cocaine is more effectual than anything else in these cases.

In cases of odontalgia, when the pain is due to exposed pulp caused by caries, it is not better than carbolic acid.

In cases of periodontitis, when the tooth is painful on percussion, and feels too long, it is useless ; counter-irritation is much more effectual.

This drug is of distinct value in practice, and should be in every dentist's consulting-room.

COMPULSORY ATTENTION TO THE TEETH OF CHILDREN (THE ARMY AND NAVY.)

By William McP. Fisher, L.D.S. Eng.

This subject belongs entirely to the public—to its school teachers, to its physicians and surgeons, its parliaments and statesmen—therefore I would ask your aid in having it removed from professional seclusion to the region of popular interest and practice. There are, however, many reasons why the dental section of the medical profession should clearly express its views on this important subject. It is the field of their work, and they are therefore "in touch" with the ravages of tooth disease in all its forms. They are likewise the organised and specially trained teachers of the people on this subject.

Through our own Dental Act, we have accepted the responsibility of treating all dental shortcomings whatsoever ; and if we, as a profession, are to keep the teeth up to the standard of our knowledge, we must teach the value of these organs to the masses, with the necessity of keeping them in those hygienic conditions necessary to their health, and without which they cannot receive treatment.

Did tooth disease come as an epidemic, or were it a contagious disease embracing a vital question, there would be

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* A paper read before the Annual General Meeting of the British Dental Association.

more energy on the part of the public in adopting conservative dental treatment, and that especially for the young, in opposition to the present listless apathy to prove that conservative treatment is necessary, let me draw your attention to the fact stated by Messrs. Ash & Sons, that 10,000,000 artificial teeth are required per annum. to satisfy the demand for replacing these organs. That a very considerable sum of money is spent per annum by the lower middle, and artizan population of our large towns on artificial dental aid goes without saying, though what the sum may be I have no means of knowing, though, doubtless, a fair estimate could be arrived at by the combined action of the members of this Association. This estimate is by no means necessary for proving the need of conservative treatment, though it would illustrate to the public what weakened physical life voluntarily spends per annum seeking to restore the ravages of tooth decay and disease by artificial structures, and it would likewise have aided me in showing that the method I am here urging would be less expensive, more healthy, and fruitful of every known hygienic principle in relation to the keeping of the teeth of the rising generation.

In discussing such a question as the subject of this paper, we have to consider "The origin of Tooth Decay" and "Its Diffusion."

The study of "the origin" finds out the causes and leads up to the true and scientific methods of treatment to establish a cure.

The study of the "diffusion of disease"—based on the knowledge of its causes—leads to the limiting of its area, through the sterilizing of the "soil" by attentive hygienic measures, which must be universal and unremitting.

The lessening of the diffusion of tooth disease is what I wish to be applied compulsorily to the mouths of school children. Day by day preventive medicine assumes greater importance, and we have the State taking a deep and varied interest in the welfare of its people with regard to the prevention of disease, through its Public Health, Factory, and other Acts, so that "the principles now affirmed in our statute books are such as, if carried into full effect, would soon reduce to quite an insignificant amount our very large proportions of preventible disease. It is the almost completely expressed intention of our law that all such states of property, and all such modes of personal action *or inaction, as may be of danger to the public health, should be brought within scope of summary* *procedure and prevention.*" I have hope of seeing the spirit of these public Health Acts yet brought home to the ordinary intelligence of our labouring and poorer classes, so that personal sanitation may keep pace with their surroundings. The effluvia of a cesspool cannot be more deleterious to the public health than life sustained by a mouth within which you may find many suppurating teeth, extended in many poor class districts to that of a continuous ooze of pus, and that generally confined to adolescence.

I should like to see taken up as practical questions, by some of our physiological and pathological members, whether respiration continued through such mouths may not lead to the lodgement of the bacteria of pus in the tissues of the lungs, and also whether the continuous swallowing of pus into the stomach is not sufficient to disorganize the structure of the blood.

It will be my duty to-day in advocating " compulsory attention to the teeth of children," to give you a slight sketch of the conditions of many of the schools in this country.

Reformatories and Industrial Schools.—I would first draw your attention to these schools, as they are directly under the control and inspection of the Home Office, though generally managed by local voluntary committees. The total number of schools under government inspection at the end of 1884 was 219. The total number of children

25,744 { boys, 20,846 } to which add
{ girls, 4898 }

2,445 children in day industrial schools.

28,189 total.

The income of these schools was -	£497,688	4	0
The expenditure - - - -	488,197	9	8
Balance -	£9,490	14	4

the treasury paying £268,686 16s. 11d. for that year ; for every child 5s., and in the case of training ships 6s. per week is allowed as money grant.

The Government grants are further increased towards the industrial training ships in the shape of consignments of musketry and small arms, &c., for *military drill*, which if much more severe physical training than mere school drill ; the Government allowing the ships a guinea per week to aid the payment of a military drill instructor. This drill is in most cases further supplemented by splendid gymnasiums, all with the object of developing physical life. That such development is necessary, I will quote a few random extracts taken from the health and general condition reports in the blue-books on these schools for 1883-84 :—

> "The chief difficulty lies in the poverty of the constitution of many of the boys." Cumberland Training Ship, Row.
>
> "The boys come into the school with a very poor capital of strength to build upon, but after a year or two of care and physical conditions the children become more robust, and eventually do well."—Mossbank, Glasgow.
>
> "Girls of poor strength and good constitution on admission."—Aberdeen.
>
> "A good many boys received of late of a low type and constitutionally unsound."—Akbar Ship, Liverpool.

You must understand that most of the children are about 12 years when they enter these institutions.

The medical expenses in connection with these schools average £7000 per annum. The school at Feltham, Hounslow, Middlesex, had alone over £410 of medical expenses for 1884, and the sum of £200 is not at all uncommon amongst these schools. Each of these schools has a local appointed medical officer who attends to it, and compiles an annual report on the health and general condition of these children, which is embodied in the reports to the Secretary of State for the Home Department, by Colonel Inglis, the Government Inspector.

In many of the schools there is periodically a medical examination—as in the army—where every child is passed in review, so that a child can be picked out here and there who is needing attention one way or another, and any endeavour made to prevent him coming on the sick list.

On examining the sick and general health reports of these schools I have never found any mention either of tooth disease or dental treatment, though I hope I showed satisfactorily in my last year's paper on this subject the amount of decay and the absolute necessity for its treatment. If the illustrations I have given you are fair types of the physical texture of these children, I cannot understand why the directors of these institutions, but most of all their medical officers, can lose sight of the perfect keeping of the teeth of more than 28,000 children, as one of the main and greatest factors in establishing physical health and physique for the youth of the coming generation, which is so absolutely essential to national prosperity. No child is admitted to these schools who is incapable of occupying a niche in the industrial pursuits of this country. I trust that soon a public opinion may be created on this subject, and that the public will impress upon every board of directors the necessity for attending to the teeth of the children.

Why the ordinary medical officers of these institutions have ignored the treatment of these dental ailments so long is not for me to say ; it may be simply from the technical requirements of this speciality determining the distinctive condition of treatment which has prevented them, or the lack of special education, and hence, as they could not accept the duties, they practically ignored them. Yet in the higher ranks of life this has not been the custom, the physician and the surgeon both directing their patients to seek the aid of the dental surgeon in the treatment of the teeth.

In these industrial training ship schools during 1884, there were being trained for a sea-faring life 3,395 boys, and, as far as I know, without any attention being given to their teeth ; and yet to the majority of these boys how much depends upon their teeth for their selection of place and their future financial and physical comfort ! During the existence of these schools—which are not yet thirty years founded—they have sent 11,000 boys to sea, and will in all likelihood send many more in the future. There were also about 2,000 boys disposed of to the army. To continue neglecting the teeth of these children—when they are at the age that the maximum of benefit may be attained with the minimum of work seems to me somewhat like our legislature continuing a vice against itself, as the very boys the Home Office endeavours so well to develop physically strong, and on whom the Treasury spends so much, are ignored by the Admiralty if they have the misfortune to be in possession of a few bad teeth, when it is scarcely possible for them to be otherwise, as they do not get their fair share of attention and treatment to sustain their physical life. What seems to me nothing short of a burlesque is that the Admiralty sets up a dental standard of excellence and yet receives a boy *with* decaying teeth. After getting him, say at the age of fifteen, they make no effort to keep his mouth in condition, not even up to their own standard, and the consequences are that if he develops, or if any decay shows up by the time he is aged eighteen, when he is re-examined by the medical officer prior to entering as a marine, he is liable to be discarded from the service. In my opinion this is manifestly unfair and unjust. This strange anomaly I feel has but to be brought under the notice of the Secretary of the Home Office to be corrected. It only requires to be suggested, or orders given, by him to enlist the sympathies of the local directors of these schools in giving to the teeth of the children under their care the same enlightened attention as is given to the other sections of their physical welfare. With one or two exceptions, where the appointments are held as honorary ones, I know of no dental attention being given to these schools, though otherwise they seem to want for nothing.

ORPHAN, HOSPITAL, AND ENDOWED SCHOOLS.—These schools occupy a large place in the rearing and educating of young life. They are in every way recognised as private schools, dependent on accumulated funds or the charity and benevolence of kindly disposed persons. There is no Government blue book on these schools, so I cannot give you either the number of schools or pupils ; yet these schools, like those I have before mentioned, are all under the care of medical men. Speaking generally, there is no attention given to their teeth beyond that of the barbarous old custom of waiting on for exposed pulps, when the decayed teeth are removed by extraction to relieve the children from agonising pain of toothache. I wish I could only enlist the sympathies of the anti-vivisection party in our country to this subject, whose labours would be well requited in lessening and curing human pain, especially when confined to the young.

There are, however, a few exceptions amongst this class of schools, such as "The Metropolitan and City Police Orphanage," Twickenham, which has 280 children, who remain inmates for five years. This school has had a dental officer since 1880. In its health report for 1881 there is mentioned : "Not more than one child in three enters the orphanage with sound teeth." The expenses for medical attendance and medicines for the year ending December 31st, 1885, were £143 3s. 3d. £20 of this sum was their dentist's annual remuneration, who says he can just keep them properly treated for that sum, though I am sorry to see no report from the dentist of this institution in its last annual report. I think the dental surgeon's individuality must not be lost if we are to educate all and sundry to the importance of attention to the teeth and the wide diffusion of their decay.

The governors of Christ's Hospital have also recently appointed a salaried dental surgeon to their staff, remunerating him with £100 per annum. I understand a similar appointment is held at the country section of this school in

Hertford, though I am unable to inform you of the remuneration, and also regret my inability to supply details of these appointments, I have written to their secretary three times, and their dental surgeon once, but I have failed to elicit any suitable reply.

In Edinburgh, Donaldson's hospital remunerates its dentist with £10 10s. per annum, and John Watson's schools with £10. Their appointed dentist informs me that these sums "are far too small to anything like pay, and little else than extractions are done." He visits three times a year, and six or eight cases of filling are done at each visit.

Prior to their new arrangements, Heriot's hospital also used to pay £10 for dental aid of the same kind.

These are only remunerated appointments I know of in this class of school, though I know of others being held as honorary appointments.

In the classes of children I have already drawn attention to, compulsory attention to their teeth is an easy question if the directors of these institutions will bestir themselves, as the children for four and five years, and sometimes longer, of the most important period of their life for attending to their teeth, are always under their care by being resident with them. They have teachers who can teach practical dental sanitation, and also see that it is carried out, which is emphatically the first step towards the saving of dental structures. As things are at present, I do not know of any of those schools being supplied with even the necessary toilet equipments for keeping the teeth clean.

The Royal Navy.—The total strength of the navy of this country is 60,000 men, the average strength afloat being about 43,000. To each and all of these men does the dental standard of the admiralty regulations apply. First, when they enter the service as boys at fifteen years of age, and at eighteen, when they rejoin as marines, and, finally, they are re-examined at ten years after the former examination, at the middle of their term of service, which is twenty years. Yet the medical authorities of the royal navy also ignore the treatment of tooth disease altogether, and I am safe to say very few of the boys receive any prior to entering. When I mention that 22,960, or 53.39, of the British navy are between the ages of fifteen and twenty-five years, need I say more to the members of my own profession to urge attention being drawn to this strange medical neglect at the proper quarters. That there is need of such, let me draw your attention to the following from the Navy (Health) Blue Book of 1884 :—

Diseases of the Digestive System.—The cases under this head numbered 6,690, the ratio being 155.58 per 1,000. Much of this class of diseases appears to prevail on foreign stations and takes form of dysentery and diarrhœa, yet very much of it is classified as dyspepsia, acute and chronic ulceration of stomach, hepatitis, &c., on our home stations.

These I point out to you, from the close relationship of these diseases with the condition of the mouth and its furnishings, but when I mention that the average total in the royal navy of men *scik* daily for 1884 was 2,219.11, which is in the ratio of 51.6 per 1,000 men—it seems to me a fair average, from the consulting of the medical reports in a few modern blue books. I hope these men will soon receive the dental attention which will keep their mouths in that condition so necessary to the full establishment of health, and which quota of treatment will go far to relieve them from the large and varied class of diseases to which they are liable from their varied climatic distribution, not to mention the inconvenience of decaying and paining teeth. In the navy estimates for the year 1885.86, there was paid for medical establishments at home and abroad £67,738 2s. 9d. I think with this sum at their credit there is no excuse for neglecting the teeth of our sailors.

As I have before stated, I entirely disapprove of the admiralty passing any youths with decaying teeth, as that is but to allow them to go from bad to worse ; and I would here distinctly and emphatically urge the necessity of dental appointments in the medical section of the royal navy, their dental officers either to hold movable or resident appointments at Portsmouth, Plymouth, or other head-quarters of that service, who would examine the mouths of the boys for entranceship, fill what teeth were decayed in the service, and surgically put the mouth into that hygienic condition which is necessary to sustain the strong physical life of Albion's defenders.

(*To be continued*).

MODERN METHODS OF ANÆSTHESIA.

By Dudley W. Buxton, M.D., B.S., Lond., M.R.C.P., Anæsthetist to University College Hospital, Soho Hospital for Women, Assistant Anæsthetist to the London Dental Hospital, etc.

(*Concluded from page* 1022).

I have striven, in adopting this apparatus, to get one which shall always be ready, and always be at hand ; shall be at once compact, portable and efficient ; and I find, from experience,that all these requirements are well fulfilled by this tripod arrangement adapted to Clover's inhaler. There is nothing very new about the details, but I find the method is not widely known, and certainly not so universally employed as it should be, were the well being and comfort of our patients the first consideration.

A common iron tripod, made lightly, but strongly, supports a cast iron bottle containing fifty gallons of liquified nitrous oxide gas. This bottle is fixed by a screw so arranged that bottles of different sizes can be used. An outflow tube is geared by brass connections with the gas bottle, this tube is again geared with the gutta percha bag between the ether inhaler and the face-piece so that gas only can, if need be, be supplied to the patient without any admixture of ether. If ether is required, by simply turning the indicator more or less, ether impregnates the gas. The supply of gas is regulated by a foot-piece fixed upon the gas bottle which, when the foot is turned from right to left, opens gas supplies ; and when the gas-bag is distended is shut off by a reverse foot movement. The face-piece I use is that designed by Clover, which possesses this great advantage, that the rim is cushioned, and so allows of adaptation to different facial development. The method of using the apparatus is simplicity itself. The gas bag is filled and the tap turned so that no ether enters ; the patient is told to inhale freely, and as soon as he does so the indicator it quickly turned to G., *i.e.*, the gas is allowed to enter the face-piece. In a few breaths, say in half a minute, a little ether is allowed to impregnate the gas by turning the tap and moving the indicator towards the letter E. In from a minute and a half to two minutes the patient will be ready for operation. By following this plan you will find yourselves able to avoid all the inconveniences which are usually urged as occurring under ether administration ; and will be able, with the utmost facility, to compass a painless, safe. and rapid anæsthesia single-handed.

When I deem ether inapplicable, I usually employ the A.C.E. mixture, commencing with nitrous oxide gas, as already explained, reserving chloroform for operations about the nose and respiratory tract when the cautery is employed. In every instance I carefully, although quietly, weigh my case, ask myself what are the surgical requirements of the operation ; and then what are the physical peculiarities of the patient, such as heart, lungs, kidneys, &c. For example, the very rapid breathing induced by ether is frequently a great nuisance in operations for the radical cure of hernia. I then select the agent my experience has shown me to answer best; in the last example my choice would lie between the A.C.E. mixture and some dilute form of chloroform, such as the proprietary material called methylene, a liquid shown to be compounded of chloroform and of alcohol. In cases of ovariotomy many surgeons prefer methylene to ether, as the respiration is quieter, and they suppose, although I think without sufficient evidence, that patients vomit less after methylene than ether. In such cases I employ a form of inhaler I introduced to the profession, through the *Lancet*, some years ago.

This apparatus consists essentially of a bottle like Junker's, only of somewhat greater capacity, and which is provided with a funnel-shaped opening in its stopper. This allows of my adding methylene or chloroform from time to time as occasion demands, without the difficulty of unscrewing the stopper, as must be done if Junker's old apparatus is employed ; it also allows one hand to be kept free, which is a great point. In my apparatus also the supply of air, which has to be forced through the chloroform reservoir, is obtained by a foot bellows. The foot is strapped to the bellows, and, with a little experience, one soon learns to moderate the supply of air, so as to push or hold back the chloroform. None but those who have had to work Junker's apparatus for some time can tell the boon that this foot piece is, enabling one to work for an hour or more, if need be, with little or no fatigue, while the hands are left free for watching the pulse, supplying the reservoir, or the thousand and one things which need attention during a protracted anæsthetic narcosis.

But there are other developments in the field of agents for producing anæsthesia. Rectal etherisation has been proposed.

Dr. Axel Uversen, of Copenhagen, and Dr. Molliere, of Lyons, have recorded cases in which the patient was rendered unconscious to pain by inhalation of ether through the rectum. This method has also been employed in America by Dr. Bull, Dr. Weir and others, but the results arrived at cannot be said to be wholly satisfactory. Dr. Molliere was led to the conclusion that rectal etherisation possessed advantages over mouth etherisation, he summed them up as follows : By the former method, less ether is employed—always an advantage, as it lessens the risk of evil after effect ; further, it induces less struggling, and curtails the stage of excitement ; by it nausea and vomiting are, if not obviated altogether, at least much less severe than when much ether is inhaled by the uncouth. However, we must remember that *quantity* of ether taken does materially affect the question of after sickness, so that if it is true that less ether is needed by the rectal method, it is simply a corollary that less nausea and vomiting should occur. Dr. Molliere further claims that the after effects of ether are much less when its vapor is absorbed by the rectal mucous membrane. Patients, according to this observer, come out of narcosis with extreme rapidity, and are free from headache or other unpleasant sensations almost directly. However, I am unable to accept these roseate views without some reservation, for Dr. Molliere does not tell us his usual mode of etherisation, which, if it is the administration by means of a cone, is altogether antiquated. The rectal method to be recognised as in anyway superseding mouth administration, must be compared with a perfected method, such as that of Clover ; and were this done, I think few would find, in the rectal plan, a method which would commend itself, save perhaps for jaw cases, cleft palates, or operations about the mouth, œsophagus or trachea. Independently of the obvious practical difficulties, the rectal method has dangers, its use having been followed by fatal results. As, however, the modes of etherisation by this plan may not be familiar to all present, I will describe them before taking into consideration the dangers connected with them. In the first instance, a long rectal tube was employed and ether pumped in by means of a common hand spray. This method was soon found to occupy too much time, and was superseded by one in which ether was evaporised by being placed in hot water, and the vapour led by a flexible tube to the usual rectal tube. A thermometer placed in the bath enabled the anæsthetist to see the temperature, and so to estimate the tension of his ether. Among the untoward results of rectal etherisation may be mentioned—great collapse, bloody diarrhœa with dysenteric symptoms, severe hæmorrhage from the bowel, presumably from undue distention of the viscus. The experience we have at present gained would seem to indicate that this mode of anæsthesia must only be considered an alternative ; one applicable—if at all—to a limited set of cases, such as I have spoken of above, and perhaps even more useful in cases when the lungs are not in good condition ; in persons so affected, anæsthesia so effected would be accompanied by a stimulation likely to be beneficial ; but, even under the most favourable conditions, I feel sure the plan is not free from danger, and should be carried into practice with extreme caution, and only after carefully weighing the advantages which are likely to follow its substitution for other more accepted modes of procedure.

In conclusion, I may briefly revert to local anæsthesia. Cocaine, the properties and uses of which I have fully discussed in an article dealing with that body, contributed by me to the last edition of Dr. Sydney Ringer's *Therapeutics*, has, undoubtedly, proved of great service ; but, unhappily, it has now been proved to be a most dangerous agent unless very carefully employed. The wholesale advocacy of it by the profession has led to much suffering and many mishaps. The cocaine habit has now assumed a terrible prominence among its habituées ; the very sap and vitality have been dried up, and the unhappy wretches who have fallen under its fatal wiles, have learned too late its vampyre properties.

Besides the "habit" cocaine produces, in a certain percentage of cases, very alarming symptoms, while in others it fails to induce any prolonged anæsthesia.

At its best, cocaine should be handled with skill and caution, and its use restricted to cases where other anæsthetics cannot be employed—if such cases exist—and further, in cases where ample provision has been made for all possible contingencies.

Of other anæsthetics I have no time to treat ; as a practical man, speaking to practical men, I should say that, for the present ether will suffice ; and I, therefore, will not attempt to enter into the merits or demerits of these bodies. In many cases, I believe, valuable anæsthetic bodies have been doomed to an untimely oblivion because, in their early days, fatal accidents were recorded under their use ; and so people were afraid again to trust an agent which had failed them once. The bromide substitutes, in the ethyl and alcohol series appear to offer some advantages over the chlorine bodies, but it is doubtful if any body with which we are at present familiar is so safe as ether; and, therefore, while we have so simple and elegant a method of producing narcosis by nitrous oxide and ether, I think we are unwise to court damage by employing other and more dangerous agents and methods, themselves, also, not free from danger.

PRACTICAL MICROSCOPY IN RELATION TO ODONTOLOGY.*

Concluded from page 1033.

By J. W. Groves, F.R.M.S., &c.

After staining, the next step is to wash the sections, and the fluid to be used for this purpose must depend upon the solvent of the stain which has been employed: thus, if an aqueous stain has been used, the sections must be placed in water; whereas, if it were an alcoholic stain, then the washing fluid must also be alcohol. The next steps to be taken must depend on the nature of the medium which it is intended to employ as a mountant. Of *mounting media* these are among the best:—

(1) *Glycerine.*
(2) *Glycerine jelly.*
(3) *Farrant's medium.*
    Gum arabic, ℥iv.
    Water, ℥iv.
    Glycerine, ℥ij.
(4) or—
    Gum arabic, 5 parts;
    Water, 5 parts.
  to which are added after twelve hours—
    Glycerine, 5 parts;
    Phenol (·05 part in water), 10 parts.
(5) *Canada Balsam* (pure).
(6) *Canada Balsam dissolved in chloroform.*
(7) *Canada Balsam dissolved in benzol.*
(8) *Canada Balsam dissolved in xylol.*
(9) *Dammar lac.*

After washing the sections, they may be mounted at once in either (2), (3), or (4), but if it be desired to put them up in (1) it is best to put them first into weak glycerine and to transfer them later on to stronger glycerine, or to place them in a watch-glass full of weak glycerine, and to leave them there with a cover, so that by evaporation the fluid may become gradually stronger, when they may be placed on a slide, a cover glass placed over them, be cemented, &c.

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* A paper read before the Odontological Society of Great Britain.

If, however, they are to be mounted in either of the preparations of *balsam*, they must, after washing, be thoroughly dehydrated with alcohol, then clarified with one of the *clearing* agents, and from that be transferred to the balsam of dammar.

Of *clearing agents* the following may be enumerated :—

(1) *Oil of cloves.*
(2) *Oil of cedar.*
(3) *Turpentine creosote* (4 to 1).
(4) *Turpentine and phenol* (4 to 1)
(5) *Absolute alcohol.*
(6) *Alcohol and phenol* (concentrated).
(7) *Oil of bergamot.*
(8) *Oil of sandal wood.*

Of the clearing agents and preparations of balsam, each has some special value : thus, if it be desired to stain with an aniline the clearing agent should be cedar oil, and the balsam should be dissolved in xylol ; whereas, if the material had been embedded in celloidin, then the clearing agent should be oil of bergamot.

All specimens mounted in a fluid, or in glycerine jelly, or Farrant's Medium, must have the edges of the cover glasses cemented with one of the following cements—

(1) *Dammar varnish.*
(2) *Balsam in benzol.*
(3) *Zinc cement.*
(4) *R. Miller's caoutchouc cement.*
(5) *Gelatin and bichromate of potash.*
(6) *Hollis' glue.*

The order of procedure to mount a specimen in glycerine is—

(1) To fix ; (2) harden ; (3) cut ; (4) stain ; (5) wash ; (6) place in glycerine ; (7) transfer to stronger glycerine ; (8) cover ; (9) cement ; (10) label ; (11) keep on the flat ;

To mount in balsam the steps are—

(1) To fix ; (2) harden ; (3) cut ; (4) stain ; (5) wash ; (6) dehydrate ; (7) clear ; (8) mount in balsam ; (9) label ; (10) keep on the flat.

With regard to the machines used for cutting sections, these may be divided into those in which the material is raised, and those where the razor is depressed for each section; or they may be grouped into freezing microtomes, and those in which material which has been hardened by other means may be cut. To prepare material for a freezing microtome the hardening agent must first be removed by maceration in water for about twenty-four hours, then for a similar period it must be immersed in *gum mucilage* to which a little spirit of camphor has been added, the object of the spirit being to prevent the gum freezing in a crystalline form, and of the camphor to avoid the growth of fungi in the solution ; the material is then ready for cutting. The gum, syrup, and bichloride of mercury may be used in exactly the same way.

When the tissue to be cut consists of very loose structure it is best to not merely embed, but to macerate in either *celloidin* dissolved in alcohol and ether, or in *paraffin* dissolved in chloroform. In the former case the material must be transferred from alcohol to a mixture of alcohol and ether, then to chloroform, from which it must be introduced into a thin solution of paraffin in chloroform, from which it may be passed into a warm and stronger solution, in which it should remain for a day or two, so that the whole of the tissues may become infiltrated with the embedding mixture. When celloidin is to be used the material should be passed from the alcohol and ether to a thin solution of celloidin in the same fluid, placed in a pill-box, and here it should remain with a bell glass over it until a thin scum forms on the surface ; the box with its contents must then be placed in about 80 per cent. alcohol, when the whole mass assumes a cheesy consistence and is then ready for cutting. For embedding material to be cut by hand, either of the embedding mixtures numbered (1), (2), (3), (4), may be employed.

Mr. Groves then gave a demonstration of the methods of cutting and putting up sections for microscopic examination, and referred the Fellows for further information to "The Microtomist's Vade Mecum," by Bolles Lee ; "Practical Histology," by Purser ; and to "Bacteriology," by Crookshank.

DISCUSSION UPON MR. GROVES' PAPER ON MICROSCOPY IN RELATION TO ODONTOLOGY

Mr. Arthur Underwood said he was sorry to see that there was so little time left before the close of the meeting that it was useless to attempt to discuss the paper. He would, therefore, only mention that he had placed under the microscope on the table a specimen which presented three different points of interest. First, it was a marked example of failure in mounting with glycerine jelly, though fortunately the air bubbles did not obscure the principal feature of the section. Secondly, it was a good specimen of staining with chloride of gold. And lastly, it showed an unusually large interglobular space, the largest he had as yet happened to meet with.

Mr. George Cunningham said he was surprised that Mr. Groves had not mentioned amongst the decalcifying agents a solution which had been recommended by Mr. Charters White in the paper which he read at the meeting of the British Dental Association at Cambridge, and which certainly gave very satisfactory results. It consisted of a saturated solution of alum with half a drachm of hydrochloric acid added to each fluid ounce.

It appeared to him that the prevailing methods of staining and mounting must be influenced by fashion ; for whilst he found Mr. Groves in London recommending logwood for staining, he had found picro-carmine in general use at Edinburgh. The latter seem to have many advantages and to be as easy of application as logwood.

He would take the opportunity of calling the attention of members to the fact that a new edition of Professor Klein's work on Micro-organisms had recently been published, and would be found very interesting reading. There were still several important questions to be solved in connection with micrococci and bacilli. Mr. Charles Tomes had recently referred to one of these, when he requested members who might meet with dead teeth the pulps of which had not been exposed in any way, to examine them with the view of ascertaining whether or not any of these organisms were present. And this was really a very simple matter. It was only necessary to open the pulp cavity, preferably under rubber-dam, to touch the remains of the pulp with a platinum point previously sterilized by heating it in the flame of a spirit lamp, to draw this across a clean cover-glass, placing another cover-glass over it and squeezing the two together in order to obtain as thin a layer as possible, and after separating them to dry by passing them through the flame of the spirit lamp. In this condition they might safely be left until a convenient opportunity offered for staining and mounting the specimens

Mr. Groves replied very briefly. He was sorry to have to confess that he had not seen Mr. White's paper, and did not know of the solution. Picro-carmine was a very useful stain, but it had the disadvantage of penetrating very slowly ; thus a section must be left in picro-carmine for twenty-four hours, whilst a few minutes sufficed with logwood.

The Chairman said it only remained for him to thank Mr. Groves in the name of the Society for his interesting paper, which contained a great deal of information of a very useful and practical nature. He also thanked Dr. Elliott, Mr. Brunton, Mr. Harding, Mr. Hunt, and the other contributors of cases and specimens.

The Society then adjourned.

THE DESTRUCTIVE ENERGY OF THE TINCTURE OF THE CHLORIDE OF IRON ON THE TEETH —AN EXPERIMENTAL STUDY.

Continued from page 1033.

By George W. Weld, M.D., D.D.S., of New York.

On referring to the card containing the specimens of teeth which have been immersed in solutions of the tincture of the chloride of iron of different strengths* it will be observed that those teeth which have been immersed in the strong solution for a period of twelve hours remain unaltered in their structure and appearance, whilst those teeth immersed for the same length of time in a weak solution, consisting of only one-half a drachm of the tincture to an ounce of water, are very materially injured.

You will very naturally enquire why it is that a strong solution of the tincture of the chloride of iron, which, containing much more acid, and acting with far greater energy on the carbonate of lime than the weaker solution, as you have just seen demonstrated, yet has little if any effect upon the lime-salts of a tooth when immersed in such a solution. Before discussing this point, let me call attention to an old and doubtless familiar experiment : When a piece of zinc is placed in strong sulphuric acid ($H_2 SO_4$), it will be observed that the acid has no effect whatever upon the structure of the zinc, but if a little water be added to the acid we find that the zinc is immediately destroyed. It is not entirely a matter of the strength of the fluids so far as the quantity of iron or acid is concerned, but a matter of construction or solubility.

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* Dr. Weld here refers to a glass case—presented by him to the Odontological Society—containing tabulated specimens of teeth which had been subjected for different periods of time to several solutions of the various preparations of iron.—(Editor N.Y. Odontological Society.)

The zinc in the strong sulphuric acid is protected from immediate destruction in the same manner that the tooth which is immersed in the pure tincture of the chloride of iron is protected,—viz., the surface is blocked up with basic iron salts, insoluble in alcohol, which prevents chemical action. In the case of the zinc it is the sulphate of zinc resulting from the first action, which is insoluble in the concentrated acid, that forms a protecting coat over the surface of the zinc. The addition of water dissolves this protecting sulphate and renders further chemical action possible. In the case of a tooth immersed in the strong solution of the tincture of the chloride of iron a similar action takes place,—viz., the oxide of iron first formed protects the tooth from immediate chemical action, owing to its compact adherence to its surface.

To illustrate still further, let me call attention to two other specimens of teeth on the card which were immersed in the tincture of the chloride of iron and alcohol. Here we shall see that, although the solution used contained the same quantity of the tincture and possessed apparently the same relative strength, being immersed for the same length of time, yet no injurious effect is produced on their lime-salts. The reason is due to the fact that alcohol is a dehydrating compound, and the peroxide which is formed in the alcoholic solution is of the anhrydous form, and in character very compact, adhering closely to the surface of the tooth, thereby preventing immediate chemical action; whilst, on the other hand, in the presence of water, the peroxide, which is precipitated in the hydrated form, and is flocculent in character, does not so well adhere to the surface of the tooth, or at least the product of the decomposition is more easily removed from the surface, leaving the free hydrochloric acid in the solution to unite with the lime-salts with greater facility. Thus we find two forms of the peroxide of iron,—viz: First, the hydrated form $Fe_2(OH)_6$), formed in the water solution, which is flocculent and non-protecting to the teeth; second, the anhydrous torm (Fe_2O_3), formed in the alcoholic solution, which is heavy and compact and protects the surfaces of the teeth. The following oermula will show how the hydrated peroxide is formed from fth anhydrous peroxide. (Fe_2O_3 plus $3H_2O = Fe_2(OH)_6$).

The teeth on the card that were immersed in a solution composed of the tincture and the elixirs are affected but very little. Take, for example, the teeth that were immersed in an ounce of the elixir of the pyro-phosphate of iron, with one drachm of the tincture of the chloride added, which was the quantity of the tincture used in the water solutions as shown in number three column. With water as a vehicle the enamel of the teeth is completely destroyed in twenty-four hours ; but with an elixir in combination with the pyro-phosphate of iron and the tincture of the chloride, the effect on the enamel is hardly perceptible. The elixirs are composed of nearly twenty-five per cent. alcohol, the presence of which, as we have just seen in the strong solution of the tincture and in the alcoholic, affords a protection to the enamel of the teeth in the manner described. It is to be said, however, in this connection that when a tooth is immersed in a solution of the tincture and simple syrup, in the same proportions *as above mentioned*, the enamel is not much affected. This is probably due to a mechanical reason or a condition of fluidity of the solution. In other words, the presence of the sugar in solution coats the surface of the enamel, preventing chemical affinity between the acid held in the solution and the lime-salts. Equally interesting are the teeth immersed in a solution of the tincture and the weak alkaline waters (notably Vichy). When a drachm of the tincture of the chloride of iron is added to an ounce of Vichy water, a slight effervescence takes place, indicating that the bicarbonate of soda in the water has neutralised a part of the free acid introduced with the iron. Thus, when a tooth is immersed in such a solution, the destructive energy of the iron is somewhat modified. Unless the specific nature of this preparation of iron to which I have alluded is materially affected (and by contact the peculiar odour of the tincture remains the same), I see no reason why it should not, at least in all cases of anemia, be administered in combination with Vichy. The specimens of teeth on the card show the slight effect such a solution produces on the enamel.

There is an objection to the use of alcohol, whether in the form of spirit or combined with syrup, in the form of an elixir. It has recently been stated by a prominent physician that, although the administration of a drug in the form of an elixir was pleasant and agreeable, and the patient perhaps cured of some particular disorder, yet it might be found after the cure had been effected that the patient had contracted a habit for strong drink. Nevertheless, alcohol in the from of a spirit is looked upon with favour by many of our best physicians, and frequently prescribed in the fevers and other affections associated with great debility. In such cases, when in addition to alcohol iron is also prescribed, they could doubtless with advantage to the patient be given together; in this manner many teeth might be preserved which otherwise would be destroyed or seriously injured. Certainly *water*, in small quantities, so far as iron in connection with the preservation of the teeth is concerned, is literally worse than nothing; and glass tubes seem to avail but little. When a tooth is placed in a weak solution of the tincture of the chloride of iron, the first appearance of a chemical action is indicated by the appearance of numberless minute bubbles distributed over the whole surface of the tooth. At the end of five minutes, if the fluid in the glass in which the tooth has been immersed be slightly agitated, a milky white cloud will be seen floating from the surface of the enamel, and if the fluid be agitated from time to time, it will, in the course of twenty-four hours, become more or less turbid, according to the amount of the tincture or alcohol contained in the fluid. If the tooth be allowed to stand in the solution without being disturbed, a precipitate of the phosphate of iron will in the course of thirty days completely invest the upper part of the tooth, hiding it from view. This deposit is beautifully shown in the lower right hand corner of the card. On the column just above can be seen the difference in the structure of the light and flocculent precipitate found in the weak solution, and the heavy and compact precipitate of the strong or alcoholic solution. At the end of thirty days from the deposit which is formed around the tooth there will appear a number of projections, extending in an upward direction, which in appearance resemble stalagmites, and which are composed principally of the precipitate which surrounds or invests the tooth or the phosphate of iron. In connection with this phenomenon it may be said that it is a well known fact that in making the superphosphate of lime—*i.e.*, the soluble lime phosphate—for agricultural purposes, the manufacturer chooses the phosphates that are free from iron, for the reason that the phosphate that they have made soluble will, from contact with the iron, become in time insoluble, forming the phosphate of iron, which shows that mere contact of the iron compound, although not soluble, will cause a reaction with the phosphates.

Dr. Weld, after reading his paper, spoke as follows:

I now wish to call attention to the action of one other acid upon the teeth, viz., acetic acid. A six per cent solution of acetic acid affects the teeth precisely in the same manner, apparently, as a six per cent. solution of hydrochloric acid, differing only in degree ; and yet, when we come to experiment with these two acids, we obtain, by reason of the difference of their degree of destructive energy, very different results.*

Whilst experimenting, a short time ago, in the laboratory of Carl Heitzmann, and with the microscope noting the effect produced by different acids upon the enamel structure, I obtained certain results which will, perhaps, ultimately be the means of throwing some light on the matter of the distribution of the lime-salts and living matter in the enamel. I had under the microscope a number of beautiful thin sections of enamel (mounted in glycerine) which had been immersed in acetic acid. The spaces that Dr. Heitzmann and Dr. Bödecker speak of as existing between the enamel-rods were so beautifully shown that Dr. Heitzmann was very much interested and pleased. But while I was looking at the section a second section came sailing along, and passed directly under the first, so that instead of looking at one section I was looking at two. Of course, my focus was gone, and I felt annoyed at losing my beautiful section of enamel-rods. To get rid of the second section I tilted the microscope slightly and struck it quickly on the table. What was the result ? Why, when I looked again for my section, I found it broken in pieces. The slight jar had isolated every enamel-rod, and I was looking at what appeared to be a bunch of sticks. Upon reflection the thought came into my mind that, whatever the cement-substance may have been which united the broken and separated rods, that substance had been destroyed by a weak solution of acetic acid, and that the enamel-rods had not been affected.

I do not, at the present time, desire to say positively that the enamel-rods are composed of the carbonate of lime, and that the intermediate cement-substance is composed of the carbonate of lime, but the inference from this and other experiments leads to that conclusion ; otherwise how is it possible, with a six per cent. solution of acetic acid, which does not destroy organic matter, or animal tissue, to separate the enamel-rods ? To strengthen this hypothesis, I wish to direct your attention to the effect produced on the carbonate and phosphate of lime by a six per cent. solution of acetic and hydrochloric acids (the latter being the acid found in the tincture of the chloride of iron).

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* Whether we use a weak solution of hydrochloric, phosphoric, or acetic acid, the enamel is first attacked and destroyed.

In this test-tube I have a six per cent. solution of acetic acid. On adding a little pure carbonate of lime or chalk, and shaking the contents, you will observe a very decided chemical action, carbonic acid being continually thrown off; and this six per cent solution of acetic acid, has, as you now observe, eaten up every particle of the carbonate of lime.* In another test tube, containing about the same quantity of acetic acid, of the same strength, I will add a little of the phosphate of lime (bone phosphate). What is the result? The acid apparently has no chemical effect upon it. The phosphate of lime is simply held in suspension. Fresenius states that acetic acid destroys the phosphate of lime. This is true so far as strong acetic acid is concerned—*i.e.*, acetic acid of the officinal strength (36 per cent.). The point to be noted in this connection is that a six per cent. solution of acetic does not act on or destroy the phosphate of lime, but does completely destroy the carbonate of lime. If I employ a six per cent solution of hydrochloric acid, as you now observe, the phosphate of lime is quickly destroyed.

Thus the experiments show that a six per cent. solution of acetic acid attacks and destroys the carbonate of lime, but not the phosphate, whilst a six per cent. solution of hydrochloric acid destroys both. In connection with these experiments and the subject of the paper,—viz., "The Destructive Energy of the Tincture of the Chloride of Iron on the Teeth,"—it is obvious that whether we use acetic, hydrochloric, or phosphoric acid, the carbonate of lime in the enamel is the most susceptible and the first attacked and destroyed. The teeth in the case which were immersed for twenty-four hours in a solution of the tincture of the chloride of iron and milk show very plainly that the cementum and dentine are not affected, but that the enamel is. The acid in this case curdles the milk, and this curd catches the iron precipitates, so that we are enabled to see the full effect of the weak acid on the enamel, minus the presence of the iron precipitates.

As I stated in the paper, there are three menstrua which may be used to modify the destructive energy of the tincture of the chloride of iron. The first is alcohol in some form.

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* If any sediment is observed after the action of the acetic acid, it is due to the impurity of the carbonate of lime.

The second is Vichy water, which neutralises to a slight extent the free acid in the iron. The third is some form of a syrup.

The specimens of teeth in the case which were immersed in three different weak solutions of phosphoric acid show the difference in effect produced on the enamel by the water and the syrup solutions. Two of these proprietary medicines were water solutions, and the effect was to injure the enamel of a tooth in one hour, whilst the last one, a syrup solution (each fluid drachm containing two grains of free phosphoric acid), produced but little if any injurious effect on the enamel in twenty-four hours.

As another illustration, take an ounce of the elixir of the pyro-phosphate of iron, and add one drachm of the tincture of the chloride. Here we have the full strength of the pyrophosphate plus the strength of the tincture of the chloride ; but the teeth in the case show that this solution has no effect whatever on the enamel for a period of twenty-four hours ; yet the use of the same quantity of water, instead of the elixir, destroys the enamel in one hour.

A NEW DENTAL JOURNAL.—Breslan has started a fresh periodical devoted to the interests of dentists and dental politics. Dr. Erich Richter undertakes the editorial department. The paper is called *Journal fur Zahuhielkunde*, and is devoted to the interests of German graduates in Dental Science. The first issues, although not a convenient size for holding, are clearly printed, and contain much of interest to both dentists and medical men. The issue is four times a year, and the price for the year is four marks (four shillings).

THE Annual Dinner of the Past and Present Students of the National Dental College will be held at the Holborn Restaurant, on Friday, December 3rd, the Dean in the chair.

The Medical and Professional Review is the title given to a new Monthly Epitome of Medicine, Surgery, Dentistry, Veterinary Practice, and Pharmacy ; a Record of Scientific, Literary, and Biographical small-talk. It is published at 27, Margaret Street, Cavendish Square, W.

British Journal of Dental Science.

LONDON, DECEMBER 1, 1886.

THE DENTAL DEPARTMENTS IN GENERAL HOSPITALS.

Some time ago there was considerable discussion about whether it was an unmixed good, or an unqualified evil that general hospitals should possess a dental appointment. It was urged that general hospitals have so much valuable material, that were dental studies more widely distributed through the various medical schools, and were students thus brought face to face with different modes of teaching, they would, through a wider experience, acquire a better insight and more extended view of their subject, and, further, the relations between dental and general students would in this way become more cordial, and the barriers between them would be broken down. The opponents of these views uphold that the facilities which general hospitals offer for the proper carrying out of dental work are so slight as to make it impossible to do justice either to the patients, the pupils, or the teachers themselves. Dental cases, they say, which drift into general hospitals are so much valuable material thrown away, and dental surgeonships at these centres of education are profitable only in so far as they enable the medical staff to call to their aid a skilled dentist, should such a person be needed, and, it may be, enable the students to see practised how teeth should be taken out, and to hear why certain teeth are so taken out, and certain others left in the patient's head. Although this may be putting the case somewhat strongly it does practically amount to this, that dental surgery, in its wider acceptation, cannot be profitably carried out at general hospitals, while, of course, the corollary follows that the bulk of general hospitals are not capable of being utilised by the dental students. And many practical difficulties arise in attempting to set up a really good dental department at a general hospital; such is the enormous labour which devolves upon the surgeon in charge, when, as often happens, only one is appointed to a school; to which is added the difficulty which is felt in getting hold of enough students willing to give their services as dressers and so on, or even to attend the surgeon's visits. Of course, at one or two hospitals where dental students "do abound" these last named difficulties will not be felt so much, but even here the men are liable to feel that their time, devoted to technical work, is more remuneratively spent in a dental hospital, while the medical school is used for a study in lines outside of technical dentistry. However one weighs these arguments, one is left in a certain amount of doubt as to which side has the most to say for itself, and so it is a sign of good augury when we find practical steps are being taken in some of our large metropolitan hospitals to furnish a dental department such as shall not be a snare and a shame. Having achieved the necessary structural changes, the questions about the possibility of carrying on dental work there become within measurable distance of a solution. At Guy's hospital, thanks to an energetic dental staff and, we may add, an enlightened committee of management, a dental department has been opened on rather an extensive scale. A large room, now devoted exclusively to dental surgery, having an excellent light, this has been fitted up with hot and cold washing appliances, gas lamps, reflectors, dental engines, water motars, saliva ejectors, new dental chairs, and a complete set of instruments and appliances. Thursday afternoons are specially set aside for cases requiring surgical treatment and the administration of nitrous oxide gas. On Friday afternoons, demonstrations on the stopping of teeth and the minor operations of conservative dentistry are given, and the method of fitting artificial plates, which are supplied to those patients from whose mouths portions of the jaw have been removed as the result of accident, disease, or surgical operations, is shown, while out-patients are seen daily. Of course this is as it should be. If it be a feasible scheme at all to convert a general hospital into a technical school of dentistry, it is difficult to understand how really busy men, such as are usually attached to the staff of a general hospital, could ever devote two or three afternoons to giving demonstrations and seeing out-patients daily. Whether committing the care of the filling room, the operating chair and the fitting room to the tender mercies of irresponsible students, would eventuate in good for the patients is, perhaps, open to doubt ; but unless the hospital provides itself with a large staff of dental surgeons and a dental house surgeon, we do not see how the plan can be worked. Perhaps we shall learn ; at least all honour must be paid to a school, which tries to present to its students all departments of medicine and surgery, and in the best possible way.

We cannot help doubting the wisdom of attempting any very elaborate teaching of practical dentistry at general hospitals, both for reasons stated above, and because we think that the material and the skilled teaching alike can be far more profitably concentrated in a special hospital. At best the general hospital will give the dental surgeon who attends daily, or two or three times a week, but a poor audience. The time in the afternoons is monopolised by medical or surgical out-patients and many other matters which the general student will place before dentistry, since they are subjects about which his examiners are apt to require apt and accurate answers ; while, if the teaching is intended for dental students attending the general school, it is manifestly not required, as it can be obtained at the special school, where more time, material and appliances can be brought to bear upon any subject of a purely technical nature. There is, however, another side to the question, should general hospitals undertake to teach dentistry ? the answer to which Mr. Hutchinson has very successfuly made conspicuous at University College Hospital. We all know and deplore the ignorance which obtains among the rank and file of medical men about teeth, their functions, and their diseases, and still more the best way of preserving them, or checking in them the ravages of disease. Mr. Hutchinson, then, has taken his stand as a teacher of medical students, and has undertaken to bring before them, in a way which they are capable of understanding, the broad outlines of dental medicine and surgery. This line of precedure has, we understand, proved a great boon, and has become very popular, numbers of " generals " attending the lectures, which, as they are held in the evening, can only be attended by men who earnestly desire teachers, for evening lectures are not usual or popular at the general hospitals.

It seems to us that the value of such lectures, if carefully given and weeded of too technical modes of expression must be very great, indeed to the young men who are preparing for general practice; and it appears to us that were similar lectures undertaken at the other hospitals, and moulded in a way to attract rather than repel an audience, much and great good would follow, alike to the pupils, and indirectly to the public, who will sooner or later fall into their hands. Of course we are aware perfunctory lectures on dentistry, are from time to time given at various schools. This is not enough ; what is needed is to make it appear to the students that the lectures are for their benefit, are well within their reach, and are not of the kind Carlyle would term " dry as dust."

THE RECENT CHANGE IN THE REGULATIONS OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.—We wonder if our readers thoroughly grasped the fact that was announced in our last issue upon this subject. We generally find a notice of this sort takes a lot of time to become common property, and to become widely known. Thus, in turning over a contemporary, we found that the change in question had been noted; but we didn't at all realise, from the language there employed in announcing it, what difference the concession would make to the student. To prevent mistakes, we will again enforce the matter by repeating that the Council of the College is now willing to accept one half of the three years of instruction in mechanical dentistry before registration as a dental student. We need hardly remind our readers this in no way alters the necessity there is for four years spent in professional work between registration and qualification.

M. Paul Bert as a Physiologist.—M. Paul Bert, whose death the French press is just now lamenting, was, before he seriously turned his attention to politics, won over to physiology by Pierre Gratiolet, the head of the Anatomical Laboratory at the Jardin des Plantes, and was for five or six years Claude Bernard's assistant. At the sitting of the Academy of Sciences, on Monday, the President, M. Jurien de la Graviére, expressed regret that politics had diverted M. Paul Bert from physiology ; and M. Vulpian remarked that his death, though glorious for the country, was a calamity for science, his numerous memoirs having placed him among the first physiologists of the age. It is told of the late M. Paul Bert, as an instance of his scientific enthusiasm and fearlessness, that at one time, when he was impressed with the prevalence of small-pox, from which those vaccinated in youth and not re-vaccinated had suffered largely, he decided to test for himself the value of re-vaccination ; and he did so in a manner which might possibly have cost him his life, had his doubts been justified. He was vaccinated, and afterwards had himself inoculated at Havre with virus from a man who was dying of small-pox. He escaped the disease. We publish an obituary notice elsewhere in our columns.

Compulsory Care of Children's Teeth.—We have, for years, insisted upon the heavy responsibility which devolves upon the state, the municipal authorities, and proprietors of large schools, with regard to the teeth of such children as come immediately under their care. We have pointed out that even the lowest motives of humanity, namely, self-interest, should induce us to attend to the teeth of the rising generation, in order to protect our nation from a progeny of creatures enfeebled and dwarfed through inheriting bad teeth. It is, then, with much pleasure we welcome the efforts Mr. McPherson Fisher is making to bring the subject of the compulsory care of the teeth of children before the profession and public. We publish an able paper from his pen upon this subject, and commend Mr. Fisher's words to the careful perusal of our readers.

THE DENTISTRY OF THE FUTURE.—We are all interested in this matter. Of course, were it asked, Who is *the* dentist of the future? the answer would be easy; each one, in his heart, would regard himself as that happy wight. But when it comes to be asked, What is to be the dentistry of the future? we all stand aghast, and say, "*Chacum á son gout.* No more extractions! No more plastics! All gold! All Herbst! Last, but not least—all American dentists and D.D.S.'s!" And yet, dear reader, has it ever occurred to you there can only be two forms of dentistry? one of which will prevail in the future, the one we call *good dentistry;* the other is styled bad dentistry. The others are all names, and even our kind patrons, the public, are beginning to rebel against being put off time after time with clap-trap names and clap-trap work. Honest, straightforward dentistry needs no puffing, no D.D.S.'s, or be-doctoring, and will stand the test of time better than rodomontade, and self-assertion.

DENTAL WOMEN.—One of our kind friends "across the pond" did us the honour to reprint an editorial of ours concerning "Female Dentists," taking umbrage—we are *so* sorry—because we called women *female.* We promise not to do so in the future, but we really thought they were of that persuasion. We were told by the same candid friend that we did the fair sex but scant justice, and pleaded their cause but half-heartedly. To this we say, No! All thoughtful men know the great and exceeding bitter cry of unemployed women, and many admit that there is an opening in some departments of the dentist's many-sided calling for the exertions of women. We are glad, therefore, to learn that the experiment of admitting women to dental classes is about to be tried at the National Dental Hospital. The results will be scanned with interest, as many questions are involved in the matter, and solutions to some may be looked for ere long.

WAKEFIELD was recently the seat of a Church Congress, and upon this occasion Mr. George H. Crowther, the well-known dentist of Wakefield, undertook to write a descriptive history of the Wakefield Battles, as well as an account of the town itself, including its archœological and historical aspects. Mr. Crowther is more than a dentist, he is a busy archœologist and fertile writer. He has written various works upon the scientific side of his professional subjects, and, by enrolling himself among the working members of various societies, has maintained his interests in matter of natural and archœological import, wholly outside dentistry. In the little book before us, we have a laborious and careful production; the matter is worthy of better paper and better type. There are several excellent cuts, but these, again, would show up much better on thicker paper. We must congratulate Mr. Crowther upon his share in the work; it is excellently done.

DENTISTRY FOR CHEMISTS.—On Wednesday evening, the 17th of last month, there was a meeting of the Chemists' Assistants' Association held in the Rooms, 103, Great Russell Street, when a paper was read on "The Latest Methods of

Preserving Apparently Worthless Teeth and Roots," by Mr. C. J. Rathbun, D.D.S. At the postponed Evening Meeting of the Pharmaceutical Society, held on the same evening it was arranged that on this occasion the chair should not be taken until half-past nine o'clock.

MOUTH WASH FOR PYORRHEA ALVEOLARIS.—Dr. Geo. Chisholm recommends a mouth-wash for the treatment of Pyorrhœa Alveolaris as follows :

Cryst. iodine, gr. iij ;
Tinct. aconite, ʒ iij ;
Myrrh, ℥ j ;
Tannin, gr. x. ;

with alcohol sufficient to make three ounces, flavoured with wintergreen. Used without water, a few drops on the brush, this wash will, he asserts, keep the mouth in good condition.

IODOL IN DENTISTRY.—Mr. E. Lloyd Williams has found Iodol of value in dental therapeutics. He uses it according to the following formula :

℞. Paraffin ʒ iii.
Spermaceti.
Yellow Wax à ā ʒ ij.
Iodol ʒ i.
Carmine gr. i.

This he uses as a fang filling, he dries the canal with saturated solution of Iodol in chloroform, then wraps Japanese bibulous paper round a Donaldson's bristle, and takes a little of the above mentioned wax and heats gently over a spirit-lamp so as to allow the paper plug to be soaked. This dressing is carried in a soft state, and the pulp chamber is filled more wax, ond sealed by the aid of a hot air syringe.

IODOL VARNISH.—This same authority recommends a saturated solution of alcohol to be added to four parts Hubbard's negative varnish. This mixture makes an excellent varnish.

A NEW DENTAL ENGINE APPLIANCE.—Mr. Wood, of Camden, N.J. writes in the *Dental Cosmos* that the soft rubber cup he has found to be a very useful appliance when fixed on a dental engine mandrel, and employed with moistened chalk or other polishing powder to clean and polish the teeth. One advantage is that under slight pressure the edge of the cup adapts itself closely to the convex surfaces of the teeth with a uniform bearing that greatly facilitates the work to be done. Onother advantage of hardly less importance is that the edge of the tool, or cup, is not turned towards the lip or cheek as is a disk, and therefore discomfort or injury to the patient will be avoided, besides affording means for cleansing not only labial surfaces but the buccal faces as well. To reach the lingual and palatal surfaces the cup is to be reversed on the mandrel. The little appliance will certainly find favour with the profession.

TREATMENT OF RIGG'S DISEASE.—Dr. Adair's method, which he had found to meet all requirements, is first to apply all over the suppurating surface and down into the pockets a saturated solution of a few crystals of iodine in pure creasote. This preparation improves with age, and not only destroys all germs bnt stimulates a healthy action. The next step is to prepare a glyceride of tannin by dissolving in glycerine in a small wide mouthed bottle as many crystals of Tannin as the bottle will contain. This makes a very thick solution, which must be applied all over the surface, the parts being first carefully dried ; the result is that the pockets are sealed up and protected for at least twenty four hours. The saliva forms a tannate of albumen which covers the pockets andsurfaces with a pellicle strong enough to resist friction. These two remedies must be used daily, the pellicle being first peeled off and the pockets filled as previously indicated. The time required in this treatment depends on the severity of the case, say from ten to one hundred and twenty days. Dr. Adair has had perfect restoration of severe cases, and would feel confident of success under his own treatment, even were the periosteum destroyed for the treatment even were periosteum destroyed for two-thirds the length of the root. In reply to a question, Dr. Adair said that tincture of iodine would not answer the purpose of his solution.

ACTION AGAINST A DENTIST.—An action, says the *British Medical Journal*, was brought against a Wexford dentist, at the New Ross quarter sessions, for negligent, improper, and unskilful treatment in an operation which he performed upon Mrs. Cobbe, a schoolmistress in New Ross. The plaintiff swore positively that the defendant, having advised her to get her teeth extracted and replaced by a new set, proceeded to perform the operation. He drew four teeth without using, as he had undertaken, an anodyne, and left her bleeding profusely. Mrs. Cobbe continued to bleed all the evening, and it was found necessary to call in two medical practitioners, who succeeded in arresting the hæmorrhage. The dentist's defence was that the woman's gums were spongy, that he used the utmost skill and care in his treatment, and that no one could have foreseen the hæmorrhage. The judge found for the dentist.

NINTH INTERNATIONAL MEDICAL CONGRESS FOR 1887. From the proceedings of the last meeting of the Executive Committee, and other sources, we learn that the American part of the preliminary organisation of the Congress, to be held in Washington, commencing September 15th, 1887, is ubstantially completed. There will be eighteen sections, in which are now enrolled as officers and members of the profession in America. Additions to the list, from among eminent members of the profession in most of the countries in Europe, are still being made. It is understood that the general programme will provide for one general session of the Congress each day, limited to two or two and a half hours, and the remaining working time will be occupied by the sections. It is the intention of the Executive Committee to have one address in each of the general sessions. The Committee of Arrangements at Washington is well organised, and is negotiation with the steamship and railway companies for commutating of fares, and with good prospects of every success. The same committee also has charge of the programme for receptions, entertainments, and excursions.

FINISHING PLATES.—With the dental engine, a large burrt sand paper disks, moose hide points and pumice stone, a plate can be finished off in a very short time, and well done. Polish with dry plaster on the fingers. We owe this useful hint to the *Southern Dental Journal.*

DISUNION IN THE COUNSELS OF THE CONJOINT SCHEME OF EXAMINATION.—The old qualification of L.S.A., which, not so very long ago, was held in the highest repute among general practitioners, and without which, even now, many parochial posts cannot be held, has been threatened with extinction by being merged into the *Nirvana* of the Colleges of Surgeons and Physicians. However, the Worshipful Society of Apothecaries prefer non-extinction, even when asked to immolate themselves for the sakes of such respectable and illustrious rivals as the Conjoint Colleges. As far as the outlook indicates at present, it seems as though the L.S.A. may, after all, upset the schemes of the Conjoint Board, and frustrate their chances of getting the much-coveted M.D. for their clients, the M.R.C.S., L.R.C.P. men. *Nous verrous.*

Abstracts of British & Foreign Journals.

THE INDEPENDENT PRACTITIONER.

PROFESSIONAL COURTESIES IN CONNECTION WITH WHAT ARE COMMONLY CONSIDERED FAILURES IN DENTAL PRACTICE.*

By C. E. Francis, D.D.S., New York.

It is unfair to judge harshly from a failure observed, and to gauge its author accordingly, for perhaps other operations from the same source might exhibit evidences of marked skill and sound judgment. Unfortunate it is, that some individuals are too ready to pass unfavourable comments upon the works of others.

It would almost seem as if in every trade or profession certain members imagine that the only possible way of gaining a reputation for themselves is in undermining the reputations of other members of their calling. In efforts to succeed they make stepping stones of their fellows, and do them injury at every tread. Sensible people, however, are not unlikely to distrust those who speak uncharitably of their compeers, and it frequently happens that ungenerous comments reflect unfavourably upon those who utter them.

When dismissing our patients, we are not always sure that they will return to us for future treatment. In the course of time many will get into other hands. Some remove to distant localities, and find it inconvenient or impossible to come again. Others, by nature, are inclined to wander and are fond of making changes. Some change with a view to economy; others, perhaps, from lack of confidence or a fancied neglect. Some fail to return because bills for former operations remain unpaid, and these persons are usually ready to misrepresent or malign those whom they have defrauded.

Many an excellent and faithful dentist has been declared the author of discreditable operations which he never performed. Many have been charged with having inserted fillings (with assertions that they soon after "fell out,") in cavities that had never experienced the touch of a dental instrument! The decay and destruction of entire dentures, resulting from sheer neglect and carelessness on the part of individuals who possess them, are often charged as malpractice on the part of some dentist who, perhaps, simply introduced a single filling, or removed beds of calculus and polished the stained surface of enamel.

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*Read before the New Jersey State Dental Society.

To take for granted all that comes to our ears from disaffected or grumbling visitors is neither wise nor just.

There are various ways of doing injustice and injury to our neighbours, without charging them with incompetency, or denouncing them as charlatans. A feigned look of astonishment when scrutinising their work, a significant shrug of the shoulder, or a disapproving shake of the head, will damage a reputation. To ask if the dentist was not in a hurry when he filled their teeth—if the dentist *himself* performed the operations, and so on—all do a man's good name much harm.

The causes that tend to failures following dental operations are many. Very many individuals defer their visits to the dentist until driven by dire necessity to seek relief from pain, and then their teeth are in a sad plight. Some cases present large approximal cavities, or crowns so decalcified and broken down that reliable walls for the retaining of fillings can hardly be secured. Exposed pulps, congested pulps, dead pulps, and alveolar abscesses, also manifest their presence; and yet it is often expected that the teeth can be rendered as good as formerly they were. The paper is closed with an appeal to dentists to act conscientiously by each other.

NOTES ON THE DECAY OF HUMAN TEETH.

By Prof. W. D. Miller, Berlin.

The object in this paper is to call attention to some isolated points in the etiology of decay.

On the Physiological Action of Fungi.

Dr. Miller has demonstrated, that any fungus of the human mouth, whether temporary or permanent, which can effect a fermentation of starch or sugar, may be instrumental in bringing about the first stage of decay ; that any which possesses a peptonising action, may, by dissolving the softened dentine, produce the second stage ; and that any which possesses both properties (and there are many such in the human mouth) may accomplish the whole process of decay. The micro-organism which produces the decalcification may also produce the solution of the decalcified substance.

Further, the reaction produced by a given fungus depends, in many cases at least, upon the nature of the culture medium. For example, the comma bacillus which is found in the human mouth liquefies the boiled white of egg (it also liquefies decalcified dentine), with the development of strongly alkaline products and offensive odours; in beef extract sugar solution the reaction is distinctly acid, with no trace of bad smelling products. The reaction of a solution containing a pure culture of a fungus can, mostly, be made neutral, alkaline or acid, at will, by varying the relative amounts of albuminous and saccharine substances present in the solution. So the reaction in a cavity of decay must depend to some, if we may not say to a great extent. upon the relative amounts of nitrogenous and non-nitrogenous materials in the cavity. This explains a frequent appearance in oral cavities, a tooth badly broken down, the pulp ulcerated or gangrenous, the gums grown into the cavity and constantly irritated by the sharp edges of the tooth likewise inflamed and suppurating. We have here an excess of nitrogenous material, and a putrid, alkaline condition. Instead of a thick layer of softened dentine, we find a thin, black, or dark brown layer of comparatively hard dentine, a condition which has led to the statement that decay of pulpless teeth is essentially different from that of normal teeth.

This, Dr. Miller explains by saying the already softened dentine has been for the most part dissolved, and, owing to the *present* alkaline condition, no further decalcification can take place from this condition to one of rapidly advancing decalcification every transition exists.

Decay of Bakers' Teeth.

In support of the chemico-parasitic theory of Dr. Hesse is quoted. He finds that bakers suffer to a surprising extent from decay of teeth, affecting principally the labial surfaces. He attributes this to their breathing in flour ; this is deposited upon the surfaces of the teeth, where it speedily ferments, after being converted into sugar by the diastase of the saliva.

CARIES UNDER FILLINGS.

All bacteria require moisture for their proliferation. The majority of them (the ærobes) require oxygen ; a few (the anærobes) grow better without oxygen ; some grow equally well with or without, while very many, if not all, may subsist for a short time on the oxygen contained in the surrounding medium.

Hence, Dr. Miller concludes, if softened dentine is left in a cavity it should, in every case, be perfectly sterilised and dried (with warm air) before filling, and the filling must, of course, be water-tight. Only under these conditions can we, with certainty, prevent the softened dentine from farther decay, since the mere exclusion of air is no guarantee against the action of the fungi.

LIME-SALTS AS ANTACIDS.

The lime-salts of the tooth are not all antacid ; the carbonate is antacid ; but the phosphate, which makes up the great bulk of the lime-salts, is not ; *i.e.*,it cannot neutralise the acids of decay. Add as much phosphate of lime to a weak solution of lactic acid as it will dissolve, or even an excess, and it will be found to be as strongly acid as before ; it retains the power of softening dentine, though less rapidly than when no phosphate is present.

A drop of lactic acid applied to dentine does not, therefore, extract that amount of lime-salt which is necessary to neutralise it, but rather that which is required to form a saturated solution of the phosphate, after, of course, deducting the amount which has been neutralised by the carbonate.

TEST FOR LACTIC ACID IN DECAYING DENTINE.

Prepare a mixture of carbolic acid and chloride of iron, as described in previous numbers of this journal (the colour must not be too deep). Put about 3 c c., say a large thimbleful, in a test tube, and carefully add the softened dentine from a decaying tooth ; let it stand from ten minutes to two hours in a dark place, and a yellow colour will usually appear around the piece of dentine, indicating lactic, citric, tartaric or malic acid, and in consideration of the fact that lactic acid fermentation has been proved to be constantly going on at certain points in most human mouths, furnishing pretty conclusive proof of the presence of the first mentioned acid in decaying dentine.

The amount of acid present in a decaying tooth is not always sufficient to produce the reaction clearly.

PIN-HOLE CAVITIES AND CARIES INTERNA."

In practice we not uncommonly meet with cases where a very small opening through the enamel is the only external indication of a very large cavity in the dentine, and even when the enamel is apparently not yet broken through, we may find, on cutting into it, a cavity already forming, or at least a considerable softening in the dentine. Dr. Miller thinks the small particles of food, which may enter through so minute an opening, bring about so extensive a decalcification.

He has seen the same appearance in pulpless teeth, and has produced it artificially. A second temporary molar which was exposed for seven months in a fermenting solution showed three pin-holes on the grinding surface, one of them extending nearly to the pulp and undermining the enamel in all directions.

He has further observed acids may work their way through enamel in sufficient quantity to produce a softening of the underlying dentine, without completely breaking down the enamel, or revealing a cavity to the naked eye or a blunt instrument.

In preparations in Dr. Miller's possession the dentine is infiltrated with micro-organisms and beginning to dissolve, while the enamel covering is still not completely disintegrated. In all cases of this nature interglobular spaces naturally play a very great role. In teeth of very inferior structures the dentine is in some places a mere framework, which is quickly softened, even by very weak acids. In mastication, food is subjected to considerable pressure, by which it may be forced through the smallest cracks and openings. We have all seen how particles of food may find their way to the very apex of a root canal which we have under treatment, ifwe allow it to remain open for a day.

(*To be continued.*)

Literary Notices and Selections.

POST-GRADUATE STUDY.

By J. D. Moody, D.D.S., Mendota, Ill.

Again, if we have the high ambition to make our profession a truly scientific one, we should do everything in our power to make it attractive to cultured minds. We can, if we will, gather the educated young men about us. It is within our power to make the name "dentist" an honoured one. But to do this we must make our work appeal to the intellectual rather than to the sordid side of man's nature.

And again, in this day, when the tendency is to subdivide every branch of knowledge into specialties, the most work, and the best work is done by the man who, after having laid the proper foundations, devotes himself to one of these subdivisions. It will be necessary for anyone who hopes to make a decided mark in his calling to first lay the broad foundation which I have indicated.

Now comes the question about which the greatest diversity of opinion may arise, namely, how shall this course of study be carried out? First, the plan suggested to me by Dr. Taft could be adopted, and the outline of study I presented, or any similar one, be carried out. This, however, requires an attendance at school of at least four years, with its consequent expenses. The higher degree of Master of Dental Surgery would of course be quite an incentive to undertake this course. Secondly, the busy man, who could not give up practice to attend school, and yet has a real desire to know, by using this outline of study as a guide to a simple course of reading, could in a few years acquire a creditable fund of information.

I would not repress individuality in this work. A man's work must be part and parcel of himself, the outgrowth of his own mind, if he would have it make an impression upon the world. Yet there must be a certain uniformity in plan and methods among those who are working towards a common end.

The want of some plan in study, the knowing just what to take up, and in what order to make the most of it, has been felt and expressed many times. I have felt it myself. Some can formulate such a plan themselves to the very best advantage. The majority cannot. To meet some such want as this, has been my aim in presenting this tabulated course of reading. I am confident that for this purpose it will leave little to be desired. The individuality will have room for play when the foundation principles here laid down will have come to be put to practical test.

Lastly, the plan, which, all things considered, I think would be productive of the most good, is that of a Post-Graduate Correspondence School. Educational authorities throughout the country are coming to recognise the value to the busy man of this method of teaching. It has been put to a practical test in a score of places. Institutions of learning, scientific societies, and other bodies are using this means of instruction with increasing satisfaction. Under this system the members of the school do not leave their homes. They engage in all their usual vocations, and thus are not at expense of time or money. The instructors in each department should be thoroughly capable men, appointed to their position by the directors of the institution. It would be necessary to prepare text books, for it is a lamentable fact that we have not to-day a properly-prepared dental text-book. They must be accurate, abreast with the latest thought, and moderate in price. An exhaustive treatise is not a proper text book. Something after the plan of those used in Huxley's School of Biology, at South Kensington, would be needed. Such books should be prepared under the authority of some inter-collegiate organisation. The pupil's work would be guided by correspondence with the tutor. Written examinations, at monthly intervals, and yearly personal examinations probably should be held.

Only one, or at most two branches, should be carried on at a time, and the student should be unlimited as to time in which to do the work. This work should be thorough, and it is possible to make it so, and when accomplished it should be recogniesd by a degree meaning something. It should mean more than Doctor or Master of Dental Surgery. I would suggest D.D.Sc., standing for Doctor of Dental Science, instead of calling this institution a School of Dental Surgery, I would call it an Institution or an Academy of Dental Science.

But we should organise such an institution? It should be left neither to personal nor to any college ambition to take up and so risk its standing. It could best be carried out through some national organisation, such as the Association of College Faculties, the Association of Dental Examiners, or by a body of directors, constituted for this purpose by some such organisation.

I expect the objection will be made that the busy practitioner has not time for such work. This objection has been made and met time and again. "Where there is a will there is a way." "What man has done, man can do again." We owe it to our profession, to our fellow men, to ourselves, that we make the most of our privileges, and live not for self alone. Allow me in this connection to quote the words of one who has had much to do with educational methods, who has come in contact with men in every station of life, and who has made a special study of this method of education. He says: "There are thousands of full-grown men . . . who are at their best intellectually, and who, with some leisure and much longing, believe they could do more than read. They want to study; to study in downright earnest; to develop mental power; to cultivate taste; to increase knowledge, to make use of it by tongue and pen and life. . . . They believe they could think and grow, speak and write. They are willing and eager to try. Out of minutes they could construct college terms. They have will enough, heart enough, brain enough to go on, to go through; and all this while the every-day life continues, with its duty for this hour and for that. They believe that into the closely woven texture of every-day home and business life, there may be drawn threads of scarlet, crimson, blue, and gold, until their homespun walls become radiant with form and colour . . ."*

It is probably true that the full benefit of this scheme would mast likely accrue to the young graduate who has long years before him, but any one with the desire, by going at it systematically and using the spare moments, can accomplish it all, I expect that some will consider me extravagant in these demands, will consider them chimerical, but I believe in them, for they are born of my convictions, and I verily believe that in some such line as this much of our future educational work is to be done.—*Dental Register.*

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* "The Chantaugua Movement." Dr. J. H. Vincent, p. 171.

Dental News.

OBITUARY.

M. PAUL BERT.

The death of M. Paul Bert, who has fallen a victim to the climate of Tonquin, has been the chief topic of conversation during the last week in scientific and political circles. M. Paul Bert was, according to the *Lancet*, born at Auxerre in 1833, and received his early education in the department of the Yonne. His first preference was for engineering, and he entered the College of Saint Barbe with a view to preparation for the Ecole Polytechnique, but, changing his mind, he commenced the study of the law, and passed successfully the examinations for the licence. He was on the point of entering a magistracy when he decided that the application of the Code was not his real vocation, and once more modified his course of study. Becoming acquainted with Gratiolet, then Director of Practical Anatomy at the Museum, he turned all his attention to original investigation, and obtained the doctorate in Medicine in 1863, and the doctorate of Science three years later.

After teaching zoology for some time at the Faculty of Sciences of Bordeaux, M. Paul Bert definitively came to Paris, acting as Flourens' substitute at the Museum, and succeeding Claude Bernard at the Sorbonne. At the same time, during the last few years of the Empire, he made himself conspicuous in the political world by his uncompromising republicanism, and at the fall of the Napoleonic dynasty, he was rewarded, by Gambetta, with the Prefecture of the Nord. In 1871, elected deputy, he became remarkable for his constant opposition to the religious congregations, which eventu ally brought about the decrees of expulsion against the Jesuits, Dominicans, and other orders. In 1881, he was made Minister of Public Instruction, in Gambetta's famous *Grand Ministére*, falling with his chief after an ephemeral exercise of power.

After the death of Gambetta, M. Paul Bert found his political influence on the wane, and partially returned to his former pursuits, obtaining a vacant seat at the Academy of Sciences. At the beginning of the present year, the attention of the French Government being forcibly drawn to the very unsatisfactory state of things in Tonquin, it was decided to send out a Resident General, invested with special powers, with a view to thorough reorganisation. The choice of the Ministry fell upon M. Paul Bert, who had always been a supporter of the present French colonial policy, and he left Paris for the East last February. The disorder in all the branches of the administration was so great that it required all the energy of the Resident General to set things right, a task which was rendered all the more difficult by the want of cordiality between the civil and military officials. It was this task that he seemed to be on the point of accomplishing when his health, already undermined by the deadly nature of the climate, gave way, and he died of dysentery on the 11th inst.

As a member of Parliament, M. Paul Bert was instrumental in bringing about the changes that have been made of late years in teaching and education. In medicine, although a doctor, he was not a practitioner, his ideas on the subject of treatment being often prejudiced by an exclusive experience of the physiological laboratory. It was thus that he took under his patronage the pseudo-sciences of metallo-therapy and dosimetry, and caused some amusement in the medical world by his ardent advocacy of hæmo-pulvine. As a man of science, he was an original worker and an accomplished populariser. He took an interest in everything, and rapidly assimilated all that he studied. But, as a matter of fact, this extreme versatility prevented him from making more than a beginning in whatever he undertook, whether in politics, science, law, or mathematics, and, it may be added, theology. A striking anecdote of his intrepidity as a *savant* is related. Some years ago he visited Havre while a severe epidemic of small-pox was raging in that port. Noticing on his return to Paris that the mortality was daily on the increase, he began to entertain doubts as to the efficacy of vaccination as a prophylactic, and resolved to solve the problem to his own satisfaction by experiments on his own person. He accordingly got himself vaccinated, and going, a fortnight afterwards, to the Charité Hospital, he had himself inoculated with the virus of a man who was dying from the small-pox. No ill effects having resulted from this terrible experience, M. Paul Bert was completely won over to the cause of vaccination, which, throughout the remainder of his life, had no warmer supporter. Of his numerous productions we may mention "La Greffe Animale" (1863), Notes d'Anatomie et de Physiologie" (1867-79), "Rechersur la Physiologie camparée de la Respiration" (his best work), and "La Pression Barométrique" (1871).

DENTAL SECTION OF THE INTERNATIONAL CONGRESS OF 1887.

Dr. Taft, the president of this section, has written the following letter to Dr. S. G. Elliot "We desire at the earliest possible moment to ascertain who will prepare papers and work for the Section of Dental and Oral Surgery of the International Medical Congress to be held next year. Will you give me the names of fifteen to twenty dentists in Great Britain and Ireland, who could and would be willing to prepare papers for the Section? Preparations are being made for a very extensive and complete, presentation of clinical and prosthetic work. The aim is to arrange for ten to twelve operating chairs which may be used by the best operators of each country and thereby have all the best methods presented by the best skill in the world. Benches, lathes, furnaces, &c., will be furnished for the use of the best skill that can be found in prosphetic dentistry. Thus will be demonstrated all the various methods of constructing and inserting artificial substitutes. Facilities will also be made for various branches of scientific work, microscopical and histological, with illustrations of the most perfect kind. Operations upon, and treatment of exposed pulps, diseased gums, and other soft tissues of the mouth will be performed by the best ability extant. Thus you see the plan is devised for large things. I trust that the meetings will be so arranged that sufficient time will be afforded for the profitable carrying out of this scheme. The clinics and practical work will be conducted in the best possible adapted rooms to be obtained in the vicinity of the hall in which the meetings of the Section will be held." He need hardly impress upon our readers the great importance to English dentistry of English Dentists making a good show at this Section. Our American brothers can all write, and, much more, can all talk, very few of us write and not many talk. He trust the few will write and speak for the many, and will adopt the motto "Little and Good."

A FATAL CASE OF PYÆMIA FOLLOWING ALVEOLAR ABSCESS.—M.Poncet, in a communication to the *Société de Chirurgie,* relates one of those rare cases of pyæmia due to alveolar abscess. The patient, who was of intemperate habits, had been ill about ten days before admission to hospital, and showed signs of severe constitutional disturbance. Locally, there was a large, non-fluctuating swelling at the angle of the jaw. The following day the outer surface of both forearms became œdematous, and large bullæ formed. Death took place forty-eight hours later. At the necropsy numerous small abscesses were found under the right side of the lower jaw, and along the upper half of the sternomastoid of the same side. The cellular tissue of the forearms was infiltrated with purulent matter, the spleen was pulpy, and the liver fatty and cirrhosed.

WOODEN NERVE-CANAL PLUGGERS.—Dr. B. Q. Stevens writing in the *Cosmos* says : I first get my nerve-canal smooth and clean ; take a new broach that will reach the end of the root. This gives the exact length of the nerve-canal. I then select a peg that will fit loosely and mark the length. This I dip in chlora-percha two or three times and let dry. When everything is ready I warm this peg and force it to the apex with a rotary motion. It will twist off only where it fits tight. For bicuspids or lower molar roots, pump in some chlora-percha before putting in the peg, which will force it all in place without any danger of drawing it out again.

APPOINTMENTS.

Mr. W. F. Brindley, L.D.S.I., Hon. Dental Surgeon to the Kidbrooke Home and Training School for Girls, Blackheath, S.E.

Mr. W. H. Key appointed Hon. Surgeon-Dentist to Training Ship "Clio."

Mr. Henry J. Moxon, L.D.S. has been appointed Dental Surgeon to the Westminster Parochial Schools.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The next meeting of the above Society will take place at the rooms, 40, Leicester Square, on Monday, December, 6th, at 8 p.m. Casual communications. Messrs. J. H. Mummery, W. Hern, J. H, Redman, E. Cunnington, A. P. Reboul, W. St. G, Elhott, J. Walker, M.D. Paper by Mr. Cunningtonon "Rebristom Skulls from tumuli in Wiltshire."

DAVID HEPBURN,
R. H. WOODHOUSE, } *Hon Secs.*

British Journal of Dental Science.

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CASE OF SPINDLE-CELLED SARCOMA INVOLVING BOTH SUPERIOR MAXILLARY BONES AND HARD PALATE.

Removal of the Tumour, together with the greater part of both bones. Recovery.

F. Bowreman Jessett, F.R.C.S. Eng.
Surgeon to the Cancer Hospital, Brompton.

S. G. B., a married woman, aged 35 years, was admitted into the Brompton Cancer Hospital on Oct. 31st, 1886, with a large growth involving the whole of the hard palate, and projecting into the mouth to the line of the teeth on both sides.

Family History.—Her grandfather died of epithelioma of the lip, no further history of cancer in the family.

Father and mother both living, and healthy; no history of syphilis.

Previous History.—She first noticed a lump in the hard palate twenty-one months ago; it grew rapidly until it attained the size of a bantam's egg, and projected considerably into the mouth, interfering with mastication and speech. She now, six months after first noticing the growth, went to Guy's Hospital; there she was operated on. Apparently, from her account, a large portion of the hard palate was removed with the growth, leaving a considerable opening in the roof of her mouth. The parts healed well, and she made a good recovery from the operation, but about three months after she noticed the edges of the opening were swollen and tender, and since then the growth has extended rapidly.

Present State.—There is an irregular mass implicating the whole of the hard palate, and the inner aspect of the gums on both sides, as far forward as the first molar tooth. The soft palate is also infiltrated with the disease to within a quarter of an inch of its posterior edge; the growth extends upwards into both nostrils, but more so in the left, where it is seen protruding for some considerable distance, presenting somewhat the appearance of a large polypoid growth. The patient cannot breathe through either nostril. By digital examination of the pharynx, the tumour is felt pressing back upon the posterior wall of the pharnyx, and it is impossible to ascertain how high it extends posteriorly.

The patient suffered comparatively little pain from the growth, but complained chiefly of the difficulty in eating, the movements of the tongue and capacity of the mouth being limited by the growth, was nearly the size of an orange, projecting into it. There had never been any bleeding.

The tumour felt hard, but seemed elastic to the touch, was firmly fixed, and appeared to extend deeply into both antra. There was a slight fulness over the left antrum, but the teeth on both sides were very good, and in no degree loosened.

At the urgent request of the patient, I consented to endeavour to remove the growth, although at the time I feared I should not be able to do so without removing the whole of both the superior maxillæ, but I determined in the first place to endeavour, at any rate, to leave the infraorbital plates intact if possible, and I hoped to be able to accomplish this, as, from the history of the case, it appeared clear that the growth commenced solely from the hard palate or from the alveolar process.

On November the 9th, the patient being placed fully under the influence of an anæsthetic, I made a most careful examination of the growth, but could find little more than I had done previously; the growth, however, extended so far back, and appeared so firmly fixed, that I had some misgivings as to the result of the operation.

Operation.—I made two incisions, extending from either angle of the mouth, upwards and outwards towards the outer angle of the orbits. I then reflected the whole of the flap thus formed, which included the nose, upwards, and in this manner thoroughly exposed the whole of the front of the growth and superior maxillary bones. I next, with a fine saw, divided both bones almost half an inch above and parallel to the alveolar processes through their whole extent, and with a raspatory, used as a lever, I separated this portion of the bones from the upper and remaining halves. Having thus loosened this portion with the tumour attached, I seized it with the lion forceps, and at the same time introduced the index finger of my left hand into the pharynx behind the growth, and in this manner was enabled gradually to remove the whole of the disease, with the exception of that portion which had grown into the antrum on the left side. This, however, was quite detached, and was subsequently easily removed by means of a Volkmann's spoon.

There was scarcely any hæmorrhage, and the disease appeared to have been entirely limited to the portion of bone removed, having grown from thence, and insinuating itself into the antrum, and upwards into the ethmoidal spongy bones.

The skin flaps were next brought together with hare-lip pins, and one or two horse-hair interrupted sutures, and the whole surface dusted over with iodoform. And the patient, who stood the operation remarkably well, was returned to bed.

She was fed for the first twenty-four hours with nutrient enemata, after which time she took food by the mouth, from a feeding-cup with a piece of india-rubber tubing attached, sufficiently long to pass over the root of the tongue.

Nov. 10.—Patient has passed a good night. Temperature, normal.

Nov. 12.—Patient still doing well. The mouth is kept washed out with a solution of boro-glyceride ; there is very little discharge. Takes her nourishment well.

Nov. 15.—Two of the hare-lip pins removed, no sign of any pus on them.

Nov. 16.—Remaining pins removed, wound perfectly healed.

The patient, from this point, made an uninterrupted recovery, and is now (Dec. 7) able to take fish, eggs, and bread and butter. Her speech is peculiarly good, in fact, with the exception of the mispronunciation of a few letters, she speaks well.

She is now about to be discharged from the Hospital, and will, when the parts become sufficiently firm, be fitted with an obdurator and artificial plate, when I hope she may be free from any recurrence of the disease.

Remarks.

This case represents one of many that not uncommonly come under my notice, and which is, I think, in many ways most interesting to the dentist as well as the surgeon. These patients, indeed, often consult the dentist in the first place, and it is most important that dentists should recognise the disease in its early stages, as, undoubtedly, by early and free removal, much future misery may be saved the patient.

Spindle-celled sarcoma, like fibroma, usually arise from the periosteum of the jaw, and I am inclined to think that the one disease is only an advanced stage of the other ; that is, that the disease commences after a fibroma, and afterwards cells become formed in the fibrous tissue,and so we have great difficulty in demarking the one from the other. Thus, Lanetrin, in his system of oral surgery, says, "Histologically, tumours found to run into each other in the manner in which these tumours are found to do, no absolute line of demarcation existing between the extremes, should be classed under a common head. Simple fibroma cannot be demarked, as extremes are concerned, from recurring fibroma. Recurring fibroma cannot be demarked from sarcoma, sarcoma cannot be demarked from encephaloma. Deduction : the most simple of fibroma differ from the most complex of encephomata alone in feature of expression ; the family is one."

These fibroma tumours, then, usually arise from some part of the periosteum. When, as in this case, they arise from the alveolus or the hard palate, they often grow on both sides, the facial and palatine surfaces absorbing the bone in their progress ; they always appear to have a great tendency to extend along the peculiar covering. Hence it is that the growth always extends so much more upwards into the antrum and nasal cavity than it does into the mouth.

In the case before us the disease undoubtedly commenced in the periosteum covering the hard palate, and extended in both directions, left and right, absorbing the line as it went, then extending along the nasal surfaces of the superior maxilla into the antrum on either side, and upwards, and backwards to the turbinate bones. So that the disease, from its earliest stage, was apparent to the surgeon. Often, however, it happens that these diseases have their origin in some part of the periosteum covering the outer surface of the antrum or the alveolar process, and frequently from the periodontal membrane. It is in these cases that the dental surgeon is most commonly consulted and interested, and they should never lose sight of this important point that when a patient consults them for some apparent trouble with the teeth, if he, the dental surgeon, should discover any fulness above the alveolar margin of the antrum, he should always be somewhat suspicious that there may exist a growth springing from the periodental membrane or from the periosteum lining the cavity of the antrum, which may very likely give future trouble.

These tumours are very slow of growth, and cause little or no pain, and no constitutional disturbance, so that patients, as a rule, do not consult either dentist or surgeon until the disease has existed for some months.

Cases of excision of the upper jaw are usually attended with surprisingly little deformity ; in the present case, with the exception of the upper lip having a very slight tendency to drop inwards, there is absolutely no deformity. These cases also afford admirable opportunities for the dentist to exhibit his skill, as, by the great advances made in this science of late years, patients can be fitted with such perfectly-fitting plates and obturator that is almost, if not quite, impossible for any outsider to discover if the wearer of the plate has his own teeth, or is fitted with artificial means. Moreover, the patients themselves are enabled to live a life of comfort, being able to talk and masticate their food as well as they did before the commencement of the disease.

CASUAL COMMUNICATIONS.*

I.

Remarkable Dentition.

Mr. Storer Bennett exhibited on behalf of Mr. Colyer, one of the students of the Dental Hospital of London, a girl aged sixteen, and presented to the Museum models of her mouth which showed a very remarkable dentition. In the lower jaw were the two first permanent molars, the four milk molars, two deciduous canines, and one peg-shaped temporary incisor. In the upper jaw there were only the roots of the deciduous canines and the right first permanent molar. The temporary centrals and the left first permanent molar had been extracted on account of caries some time previously, but no other teeth, as far as could be learnt, had ever been erupted.

The patient's history was of a very negative character, no abnormality having been noticed in the dentition of her parents, or of her brother and three sisters, all of whom were younger than herself. The girl's hair presented no peculiarity, and there was nothing in her personal history which tended to elucidate her condition.

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* Communicated to the Odontological Society of Great Britain.

II.

ARREST OF DEVELOPMENT OF THE MOLAR TEETH.

MR. CHARLES TOMES showed a model of a remarkable case of arrest of development of the molar teeth, and also one of the teeth which he had extracted.

The patient, a man aged twenty-five, came to him complaining of pain in the right upper second molar. This was found to be due to an exposure of the pulp, the result of absorption caused by the pressure of the wisdom tooth. Mr. Tomes therefore extracted it, and found, to his surprise, that it had no roots. Moreover, he ascertained, by passing a probe beneath the crown of the first molar, that it also had no roots. The crowns of both these teeth were fairly developed and at their proper level, but all the other six and twelve-year molars ended level with the gum; the right upper molars had apparently been pushed up to the level of the other teeth by the eruption of the wisdom tooth on that side. From this Mr. Tomes was inclined to doubt whether any of these molars had roots. The remarkable fact in the case was that this arrest of development took place at the same stage of the growth of the teeth, but must have occurred at different periods in the life of the individual.

Mr. Tomes also showed a model of the mouth of a lady whose twelve-year molars were very small, whilst the other molars were well developed.

Also a central incisor which had been handed to him for exhibition by Mr. Turner. It had been extracted on account of looseness, and it was then found that the root had been entirely absorbed. The base of the tooth looked almost like that of a properly shed temporary tooth, but the margins of the cup-shaped depression were very regular and its surface remarkably even. No cause could be assigned for the absorption.

Mr. R. H. Woodhouse pointed out that there was a filling on one side of the tooth, and suggested that this might have been the primary cause of the periosteal irritation of which the absorption was the result.

Mr. J. F. Colyer showed models of a case very similar to that exhibited by Mr. Storer Bennett. The patient was a gentleman about thirty years of age, strongly built, of active habits, and who, except for indigestion, due probably to his deficiency of teeth, had enjoyed good health. Of the permanent set he had only the four six-year molars; there were also seven temporary molars, and two malformed incisors, one in each jaw. The temporary teeth were extracted and artificial dentures fitted. These he had now worn for some years, but no more teeth had made their appearance.

III.

PRACTICAL HINTS.

MR. S. J. HUTCHINSON laid before the Society some hints on various practical points which he hoped might be found useful.

From what he had seen during his visit to the United States in 1879, he thought that communications of this kind were more common in the American Dental Societies than they were in this country. He had himself derived benefit from some of the hints and contrivances which Dr. St. George Elliott had brought under their notice on several occasions, and he thought that Dr. Elliott's example might with advantage be more frequently followed than it had been hitherto. Possibly members might be diffident about bringing forward what seemed to them to be small things, but these small matters were often very useful in practice, and in fact this was the only excuse he could offer for his present communication.

All must at times have experienced the annoyance after mounting gum blocks of finding the joints come out black on the finished plate. In order to prevent this, some practitioners were in the habit of covering the joints inside and out with strips of No. 60 gold foil to keep out the rubber ; but this did not always suffice. He had found that the easiest way of getting over the difficulty was to put the case into a thick paste of chloride of lime, and at the end of six or eight hours the black lines would be found to have been completely removed.

In pivoting teeth it was often convenient after preparing the root and taking a model, to send the patient away and complete the operation at a subsequent sitting. To be obliged to go about for a day or two with a gap in front of the mouth was rather an unpleasant ordeal, especially for a lady, and in order to obviate this he found it a good plan to keep a few pivot teeth on hand,—some six or eight of various sizes and colours,—from which one roughly suited to the case could be selected and fixed temporarily but securely until the proper tooth is ready. Even a bad match was better, in the opinion of most patients, than the conspicuous disfigurement.

No doubt most of the members present had sometimes found it troublesome to match the incisors of elderly people when the teeth are dead or dull from the deposit of a thin layer of tartar. The plan commonly adopted in such cases was to rub the surface of the artificial tooth with sand-paper, but an easier way was to wipe over its surface with a little fluoric acid ; this took off the gloss and left exactly the smooth dull surface required. Owing to its property of dissolving glass the acid must be kept in a gutta-percha bottle.

He often wished that he had five hands and no back, and probably others had been equally puzzled in trying to make two hands do the work of three, as for instance when one wants to use both hands in filling a cavity on the lingual surface of an incisor and to hold a mouth mirror at the same time. Under these circumstances the plan he adopted was to place a cork between the teeth, have a mouth mirror with a piece of wire attached, instead of the usual handle, and to stick this into the cork. The latter acted as a gag, keeping the mouth open, and the mirror could be adjusted in any position and at any angle ; it also served to keep the tongue down. He knew that some practitioners had a means of attaching the mouth mirror to the rubber dam clamp, but he thought his plan preferable on the whole, as being so very simple.

The President remarked that Mr. Hutchinson's communication was by no means the least valuable of the many he had heard in that room. He should certainly bear in mind his suggestion with reference to the mouth mirror. The suggestion with reference to pivoting was also a good one ; it was very annoying to a lady to go away with a gap in her front teeth. But he would impress on those who might try it the importance of making these temporary pivots secure, for patients were not always to be depended on, and they might be served as he had been by a lady who, instead of making her appearance at the appointed time, did not come back for six weeks, and then only because she had swallowed her tooth at breakfast.

Dr. St. George Elliott inquired how Mr. Hutchinson fixed his temporary pivot. A plan which he sometimes adopted as a temporary expedient, in order to ascertain whether a root would bear a pivot or not, was to take an ordinary plate tooth, attach to it with soft solder a German silver pin, insert this into the foramen, and pack amalgam round the head and against the back of the tooth. This could all be done in from fifteen to thirty minutes.

Mr. F. J. Bennett said he had found that the appearance of the black line spoken of by Mr. Hutchinson could be prevented by running a little thin osteo over the cracks between the blocks before packing the rubber. The plan suggested by Mr. Hutchinson seemed, however, to be a very simple and easy way of getting rid of it when it did make its appearance. He had found that when American teeth had been shaped, a black deposit, which it was very difficult to get off, was apt to form on them during the process of firing. He thought that possibly the chloride of lime treatment might be found useful for getting rid of this also.

Mr. Hutchinson replied that he used a hollow pin and floss silk, and took care to make the tooth secure. He had no fear of the patient not returning to have the operation completed ; the effect of his temporary stop-gap was not good enough to satisfy a patient even for six weeks.

IV.

Process of Facing Hard Rubber Surfaces.

Mr. Walter Coffin then described a process of facing hard rubber surfaces with metal, recently invented and patented by Mr. M. G. Cunningham, and showed specimens of its results.

From the time when vulcanite was first introduced, the advantages of such a process as Mr. Cunningham claimed to have perfected had been generally recognised, and many attempts had been made in this direction, but invariably failed, owing to the tendency of the gold to scale or strip from the rubber. Mr. Cunningham therefore made various experiments with the view of obtaining a more intimate mechanical admixture of the rubber and metal. He found that small particles of metal forced into the surface of the rubber and baked in could not be removed except by actual digging out, but he had still some difficulty in devising a means by which an equal and regular distribution of the divided metal in the substance of the rubber could be secured. The method finally adopted was as follows. All surplus rubber having been expelled and removed, the flask is closed with a fairly thick piece of calico or rag between the rubber and the model, then opened and the cloth taken away. The rubber is then painted with a special adhesive solution and the model treated with a preparation to secure a smooth surface. Finely sifted filings or a precipitate of the metal to be used being then spread upon the prepared surface of the rubber, and also upon the model, the flask is put together, closed and steamed in the usual way. After vulcanisation the metalised rubber surface is finished with a smooth stone and burnisher, and, if suitably prepared, may be plated, gilt or otherwise treated by electro deposition and the metal coating increased to any desired thickness.

Mr. Coffin added that his own experiments with this process showed that the coating obtained certainly adhered very firmly, and could not be detached without destroying the surface of the rubber ; but it was not a continuous surface, at all events when filings were used, and he had not been successful in his attempts to plate upon this interrupted surface. By using a fine precipitate of gold he had obtained better results, but a large quantity of the precipitate must be used, and there was considerable loss. Still, no other process yet introduced gave equally good results, and he thought it was worthy of further trial.

Dr. Walker said Mr. Cunningham had explained the process to him, and he had tried it in two cases. The first attempt was similar to Mr. Coffin's, but the second was more successful. It was sent to an electroplater, and came back beautifully plated, but as it had only been worn five weeks he could not yet say anything about its durability.

Mr. E. Moore remarked that many attempts had been made to coat vulcanite with gold leaf, but it always wore off very quickly. The process just described seemed likely to give better results, but he should be glad to know what thickness of gold Mr. Cunningham considered necessary to stand the friction of the tongue, &c.

The President remarked that it was certainly a very ingenious process, but he was puzzled to understand how an interrupted surface of metal could be made continuous by the bridging over of the intervening spaces of non-conducting material.

Mr. Cunningham replied that whatever the explanation might be, there was no doubt of the fact that the interrupted surface first obtained could be made continuous by electroplating, and he pointed out that Mr. Coffin's failure was due to his having omitted the preliminary step known amongst platers as "quickening," viz., dipping the article into a solution of nitrate of mercury.

COMPULSORY ATTENTION TO THE TEETH OF CHILDREN (THE ARMY AND NAVY.)

(*Continued*).

By William McP. Fisher, L.D.S. Eng.

The Royal Naval Reserve consists of 30,000 men, made up of seamen drawn from the mercantile marine service, 20,000 of whom are known as first-class men and 10,000 as second-class men. I need not enumerate the qualifying distinctions, but no sailor can now enter this service, *or even rejoin*—which he does every fifth year—who has lost from five to seven teeth, and this means in money to the first-class men £10 4s. and to the second-class men £8 per annum, with medical and other advantages while on duty. I entered into this pretty fully in my last paper, therefore I need not recapitulate, but draw attention to the new class of men the royal naval reserve are now enrolling, namely, firemen or stokers for their large steamships, this class receiving £5 per annum as a retaining fee, with no drill. Since the establishment of the firemen class in December, 1885, out of 320 applications for enrolment, 36 have been rejected on account of defective teeth, from the reports which are deposited in the London central office. In all probability there would be more than that, as the local secretaries of the mercantile marine boards very often answer the men thus—"Oh! you are defective in the teeth, and you need not go to the doctor, as you would not be passed," and hence there are numbers of men who are never entered in the books.

The Army.—The army has already received attention at the hands of Mr. Gaddes, one of our members, whose paper will be found in our transactions in connection with the International Medical Congress of 1881, but army schools receive no other dental attention than that which can be received from the medical officers, of which there are about 1,000 in number in the service of the army in times of peace.

There are 16,000 children in the army, who are supplied with all the necessary medical and surgical treatment, minus conservative surgical treatment, for their teeth.

In the army I would have appointments similar to what I seek to be provided for in the navy, that is, that each army medical corps should have its quota of qualified dental surgeons, to keep the teeth of the army in the best condition possible for fighting men.

WORKHOUSE SCHOOLS. — Workhouse schools contain another class of children under direct medical supervision, and when they are not, as is the case of boarded out children, medical attention is willingly paid for when required.

There is nothing to hinder a dental surgeon, any more than the ordinary medical officer, to hold an appointment under the Parochial or Poor Law Medical Act for the treatment of diseases of the teeth of the very poor, which is so absolutely necessary for the comfort of that class, namely, that of a strong physical welfare ; or what would suffice is the better equipment of our provincial hospitals with remunerated dental officers.

It affords me pleasure to testify of my appreciation of the growth of dental hospitals over our country, due to the zeal of many of my professional brethren, where even the very poor can have that skilled attention, equal to the ordinary practice of surgery, without money and without price.

From the Board of Supervision for the Relief of the Poor, and of Public Health, Scotland, 1884-85.—The number of *orphan* and *deserted* children for Scotland during the year was 6,996, but the number chargeable on one day (14th May) was only 6,456. Of these, 3,576 were orphans and 1,872 deserted.

The number of those children boarded out with respectable families in rural districts, was, for 1885, 4,963.

Under section 69 of the Education (Scotland) Act there are 26,908 pauper children educated at an expense of £15,991 ; and also, under the same educational sectional section, 17,204 non-pauper children who received education at the cost of their respective parishes at an expense of £8,977. And this is exclusive of the cost in Deaf and Dumb Institutions and other similar places, and of course irrespective of the Industrial Schools.

In England and Wales for 1883 the total parochial medical relief expenditure was £317,233, out of a gross expenditure of £15,057,179.

I regret my inability to give the exact numbers of workhouse school children in England and Wales, likewise the number of non-pauper school children, educated at State expense, but these can easily be gained by anyone interested from the current blue books.

Recently, another appointment of considerable interest to us, as a profession, has taken place under this class, namely, that of the election of a dental officer to the Parochial District Schools of Upper Norwood. The directors of these schools have followed the lead of the Anerley Directorate in but a half-hearted manner when they offered not less than £30 per annum for a dental surgeon to take charge of the teeth of 700 children. When I mention that their advertisement produced thirty candidates for this appointment, I think you will admit that it is not with a mercenary motive any such appointment could be held. It is questionable whether the modern dentist can be true to his profession, himself, or his appointment, at such remuneration, but it is the thin end of the wedge; and, what with annual reports and special applications to the directors, I think these appointments calculated to be a great lever in establishing physical force to the children, and a fitting outlet to our young educated dental practitioners.

(*To be continued.*)

A REMARKABLE CASE OF DENTAL DEVELOPMENT.—Dr. Catching brought before the Southern Dental Association the following most remarkable case of dental development: Julia Wells, now fifteen years of age, was prematurely born in the sixth month of gestation. She was always very delicate and very small. At six months of age a small set of teeth was developed, which disappeared within three months. At eleven months she began teething again, and at fifteen months an entire set had developed, which in six weeks became dark, and crumbled away like chalk. Her weight at that time was ten pounds. The child was faithfully nursed at the breast, and was given cod-liver oil and lime-water three times daily. At two and a half years of age the third set of teeth appeared, small and fragile, which was retained up to the fourth year, when the teeth were removed, with the result of decided improvement in the child's health. Some of these teeth had very small roots, others none. The girl was now toothless for a series of years, with the exception of four curious little upper incisors, shell-like and rootless, so slightly imbedded in the gum that they were easily removed with the finger-nail. At seven years of age she weighed thirty pounds. The fourth set of teeth began to appear at the age of eleven.

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A HAPPY CHRISTMAS!

Before we again go to press, Christmas, 1886, will be matter of history! Ten short days ere you and I, dear reader, will be in the ingle-nook; it may be amid dear friends and loved ones, amidst our Lares and Penates, or perchance it will be in the fireside ingle of our memory, lit, not, alas! by the bright glow of the Present, with its living joys and hopes, but by the flame kindled by recollections of the kindly Past. Whether Yule-tide greets us in the happy home, or in the chamber of the recluse, amid the throng of glad faces, or in that solitude of solitudes, "alone amid the crowd," it will still be Yule-tide, and we bid you all a hearty good wish. A wish for contentment, and, if it may be so, for much joy and happiness, merriness, and a well-earned and well-enjoyed holiday. Readers all, a joyous, rollicking Christmas to you!

THE MICROSCOPE IN DENTISTRY.

It is within the recollection of many medical men when a microscope was a rather startling novelty, and its application to scientific surgery a departure pooh-poohed by members of the older schools of thought. The use of the knife, alike for the living and the dead, was deemed the one thing needful for the attainment of knowledge of the physiology of disease. Nowadays, no student of medicine and surgery can be considered properly prepared for the battle against disease and death unless he has access to the microscope, and is well skilled in the preparation of tissues and the methods to be followed in their due exhibition. Whereas, formerly, a massive mountain of brass, with not over-accurate lenses, termed "the microscope," and belonging to the Professor of "Anatomy and

Physiology," represented the only available means of prosecuting histological research; now every one can, by the expenditure of a few pounds, acquire a compact and accurate microscope, and if he is ordinarily deft of hand, become a good microscopist. Nor is Dentistry, as a branch of surgery, exempt from the necessity of employing the microscope. Our students are at present taught—not always very thoroughly, it is to be feared—the use of the microscope, and unless very idle, they acquire fair powers of manipulation. But they do not, as a rule, grasp the importance of the microscopist's art, and many forget in after life the rudiments of microscopy picked up in students' life. It is well, then, that the matter of the use of the microscope in dentistry should be taken up and laid before the profession. The Odontological Society and the Dental Association have done good work in bringing the subject forward, and Mr. Charters White's paper, although beyond the range of very many, still points out to all that dental microscopy has developments well worthy of attention and ambition.

Among dentists there are very many who do not care for physical exercise, and have not any particular ply or bent art, and who yet feel the need of some fixed and engrossing recreation. For these no form of amusement affording work for eye, hand and brain, which combines interest of no common kind with self-improvement and general utility, can equal microscopy. It has so many advantages and so few counteracting drawbacks that it seems strange that it is not more commonly adopted, and some means of uniting interest, such as a dental microscopists' club started. Microscopy can be prosecuted alike in the daytime or in the evenings; it can be taken up for half an hour, or continued for a day. One's materials are always ready, and the fields of labours are practically boundless.

For country dwellers the many dentate animals are within reach; or should pathology claim more attention, the teeth drawn from patients are themselves capable of providing much profitable work. And again, the rapid strides which have been made in bacteriology have introduced to us dentists the very widest range of research. At present, little enough is known concerning the bacteria of the alimentary canal, or their behaviour and life history as states of health and disease. The able and zealous labour of Miller, of Berlin, which cannot fail to leave their impress upon the age, have shown us a multitude of facts and opened to us vistas of facts as yet unknowable and unknown. The methods of bacteriological research are simple enough ; in most cases, *care* and *patience* and infinite attention to *detail*, are all that are needful, and all these anyone may attain. Microscopy, unlike many pursuits, may be taken up "late in life." It needs no long novitiate, while its details are pretty soon acquired by anyone who has a little perseverance. Of course we refer to the more manipulative part of the work. A microscopist may, or may not know much about the specimens he prepares. Many of the most skilled section-cutters are wholly innocent of histology, whether of normal or pathological tissues. And herein lies the peculiar advantage of this pursuit. The manipulative processes give the tired brain leisure for rest and recuperation ; the inspection of the sections prepared, acts as an incentive to mind work in the lines of histology. Again, yet another huge field for research lies in the study of tooth development. In spite of much labour and curious research, there yet remain many facts to be explained and many to be described. The methods are necessarily more complex in studying the histology of development and high powers of the microscope are needed for its elucidation. We have hastily glanced at several fields of useful enquiry open to dentists should they be inclined to follow our advice, and take up microscopy as a pastime ; many others are open, but we have not space to detail them. Mental rest is not so much what is in most cases needed as is a change of occupation, a distraction of the mind from the every-day's hum-drum existence, and we believe few scientific pursuits offer so valuable a change, or so interesting and varied a programme within easily accessible limits as microscopy offers. It is capable of the most valuable and useful developments, and has room within its ample domains for the whole profession and many more, so there is no fear of overcrowding !

COMMEMORATION OF THE QUEEN'S JUBILEE.—It has definitely been decided to hold a Banquet to commemorate the auspicious occasion of H. M. the Queen's year of Jubilee. The Banquet will take place at the Hôtel Mètropole, Northumberland Avenue, on March 10, 1887. Sir James Paget, Bart., has consented to take the chair.

POSTPONEMENT OF THE PAST AND PRESENT STUDENTS' DINNER.—In consequence of the above-mentioned Jubilee Banquet, it has been decided to postpone the Dinner of the Past and Present Students of the London Dental Hospital until December, 1887, as it was felt that it would be a pity to permit the two dinners to come too closely one after the other.

RESULT OF THE ELECTION TO THE GENERAL MEDICAL COUNCIL.—The election of representatives to the General Medical Council has resulted in the division of the general practitioners' vote between Mr. Wheelhouse, who heads the poll with 8,548 votes ; Sir B. Walter Foster, who runs second with 7,718 votes ; and Dr. J. Grey Glover, who obtained 6,614 votes. 18,074 voting papers were sent out in England, and 13,381 returned. For Scotland, Dr. Bruce heads the poll with 642 votes ; while Dr. G. H. Kidd, of Dublin, scored highest in Ireland with 911 votes.

LECTURES AT THE ROYAL COLLEGE OF SURGEONS.—Our readers will be glad to hear that Mr. Christopher Heath will deliver lectures, during the ensuing year, at the College. The subject, "On certain Diseases of the Jaws," is one which must recommend itself to dentists as touching upon the branch of surgery with which they are most commonly brought in contact ; while the fact that the lecturer is one of the greatest living authorities on the surgery of the jaws, gives earnest that the lectures will contain much of interest and novelty. Mr. Bland Sutton, whose learned adumbrations before the Odontological Society have made him well known to dentists, gives some lectures upon "Evolution in Pathology." Professional men are admitted to all lectures on presenting their visiting cards.

ROYAL COLLEGE OF SURGEONS IN IRELAND DENTAL DIPLOMA.—We may mention that the next Examination will be held on Monday, the 21st of February 1887, and following days. Applications must be lodged with the Registrar at the College, on or before the 7th day of February 1887. The Regulation and Forms of Applications may be obtained from the Registrar.

THE NOVEMBER MEETING OF THE ODONTOLOGICAL SOCIETY.—This meeting was a peculiarly profitable one. Many of us are very unlearned, and pine much for practical hints. If we have to sit for over an hour and hear learned discussions upon recondite subjects, we either get so disgusted with our own ignorance, and go away—never to return—because "it is beyond us," or we "sleep the sleep of the *after-dinner* just." However, when we are treated with nice little clearly-worded tips about our every-day work, which help us without frightening us, why, we go away at the close of the meeting feeling wiser and contented, and straightway record a vow to return with the returning Mondays. Of course, the profound, alike among doctors and dentists, require highly-flavoured food ; and disquisitions about "the denture of the megatherium," the "complex results of cortical irritation, due to intra uterine, premature *eruptio dentium*," are as the breath of their nostrils, and we envy, while we cannot attain to, their encyclopædic erudition. We do not grudge them their sweet dalliance with the recondite matters of science, but we are very thankful when they allow us to have an evening at the "Odonto" devoted to wholly practical matters. There are "clinical nights" at the medical societies, which are not the least popular or useful, and so "clinical nights" at our society come as "a boon and a blessing to men," and we heartily wish for many happy returns of the day.

A MUMMY WITH TEETH.—The Mummy of Rameses II. of Egypt, the Sesostris of the Greeks, and the Pharaoh of the Bible, under whose reign the exodus of the Jews occurred, has lately been unrolled at Boulac, a suburb of Cairo, in Egypt, in the presence of the Khedive, the director general of the excavations and antiquities in Egypt, and other high dignitaries and learned men from all countries. It was discovered in the subterraneous hiding-place at Dayrel-Bahari, and its identity was fully established by the ancient inscriptions. Rameses ruled in Egypt more than 3,200 years ago. His reign was a very long one—67 years—and he must have been nearly 100 years of age at the time of his death. He was an exceedingly warlike potentate, and conquered a number of countries. He also built some of the most enduring of the wonderful Egyptian monuments of skill and labour, and ranks as one of the greatest monarchs who ever sat upon the throne. The head was found to be long, and small in proportion to the body. The top of the skull was quite bare. On the temples there were a few sparse hairs, but at the poll the hair was quite thick, forming smooth, straight locks, about five centimetres in length. White at the time of death, they had been dyed a light yellow by the spices used in embalming. The forehead was low and narrow, the superciliary ridge prominent, the eyebrows thick and white, the eyes small and close together, the nose long, thin, and hooked. The temples were sunken, the cheek bones very prominent, the ears round, standing far out from the head, and pierced for the receiving of earrings. The jawbones were massive and strong, and the chin prominent, the mouth small but thick-lipped, and filled with some kind of a black paste. On clearing this away, a set of white and well-preserved teeth came in view, which were much worn and very brittle. The moustache and beard were thin, and seem to have been kept shorn during life. We cull the above interesting particulars from our contemporary, the *Independent Practitioner.*

How to Test the Purity of Water.—The vast importance of ensuring the purity of one's water supply can hardly be over-estimated. It is often required to give a quick indication of the freedom, or otherwise, of water from organic products. The rough and ready permanganate test cannot be relied upon. Most organic bodies—that is, those containing nitrogen—are converted into ammonia, which is ultimately oxidised into nitrous and nitric acids. The detection of nitrous acid, therefore, is important, since its presence is sufficient to condemn any water for domestic purposes. Mr. C. C. Howard has suggested a ready test, which is as follows: Into a test-glass place some of the water (not more than 50 c. c. or ℥iss.), and add a drop of hydrochloric acid, then a drop of sulphuric acid, and one of a solution of naphthylamine hydrochlorate. If the water does not contain more than 1 in 100,000,000, after standing for ten minutes it should not show more than the faintest tint of pink colour.

Caffeine as an Anæsthetic.—As many of our readers will, no doubt, be well aware, cocaine, caffeine, and theine, respectively the active principles of cocoa, coffee, and tea, possess a close chemical and physiological relationship. Dr. Terrier, of Paris, has recently been led by this known connection of these three substances to investigate the powers caffeine might have of producing anæsthesia. According to Dr. Terrier, the hydrochlorate of caffeine is as powerful an anæsthetic as is cocaine. We should like to hear of any dentists who have employed this drug.

A Useful Clamp in Crown and Bridge Work.—Dr. Geo. W. Melotte, of Ithaca, N. Y., has, according to the *Independent Practitioner*, devised a set of soldering clamps which will be found very useful, especially to those who are engaged in making crown and bridge-work. Into a wooden handle are inserted iron fingers, the ends of which are adapted to hold securely different forms while soldering. They are made of iron, so that they may be heated and cooled repeatedly, or plunged into water while hot, without hardening. They will frequently obviate investment for the purpose of holding parts together, and will save the time necessary in making special clamps, or in tying together with binding wire, besides holding small pieces more securely.

AN *argumentum ad hominem.*—If we only could believe it! we should feel proud of our profession and of the man who could, by his promptness, shower glory alike upon himself and his profession! We take our facts from the *Medical and Surgical Reporter*; and, as we said before, we hope it's true, only we are sorry for that little boy: "A novel way of reassuring a patient was lately resorted to by a dentist in Mexico. A patient was to have a tooth extracted, but the preparations so frightened him that he declined to submit to the operation. To allay his fears, the dentist made his office boy open his mouth and in a twinkling took out one of his teeth. We are not surprised to learn that the little fellow threw up his situation at once."

A LITTLE KNOWN ANTISEPTIC.—Myrtol has only been hitherto studied as a curiosity. Dr. Linarix, in his doctoral thesis, "De l'Emploi du Myrtol," gives a complete account of the properties of this substance. Myrtol is both an antiseptic and a disinfecting agent. By its presence it prevents the decomposition of fermentative and putrescible organic substances; applied to the skin, it does not produce the slightest irritation, if the epithelium be intact. If there be a slight abrasion, a few drops will produce a very trifling burning sensation, which quickly goes off. Myrtol stimulates the digestive faculties; all who use it find their appetite increased. In small doses it acts as a sedative. It is eliminated by the ungs and kidneys, and has also a powerful balsamic action, but is more easily tolerated than most balsams. Its use is not followed by dyspepsia, nor by any of the other troubles attending the use of balsams in general. Dr. Linarix says that myrtol does not produce the same result at all periods of the affections of the respiratory system. In subacute and chronic catarrhal affections, it should be administered when fever has subsided; then the sputa becomes less abundant, also less purulent. Six capsules daily, each containing fifteen centigrams of myrtol, form a moderate dose, which should be taken before meals.

"KAVA" AS A LOCAL ANÆSTHETIC.—Lewin (*Deutsche Medicinal Zeitung*,) reports the results of additional personal experiments with this new narcotic, the anæsthetic properties of which are singularly like those of cocaine. He found that six or seven minims of a solution of kava, injected beneath the skin, produced complete loss of sensibility in the surrounding area, which did not pass off for five days. The anæsthesia was so extreme that even strong induced currents failed to produce more than a slight prickling sensation. When a small quantity of the resin was placed on the tip of the tongue the bitterest drug could not be tasted.

A NEW DENTAL REVIEW.—We have received No. 1, Vol. I., of *The Dental Review*, a monthly issued by the Dental Review Company, and published in Chicago by Keener. The price is twenty-five cents. The first issue contains several excellent articles. It is well printed, and in all respects up to the times.

Abstracts of British & Foreign Journals.

SOUTHERN DENTAL JOURNAL.

A COMPLETE SYSTEM POSSIBLE IN FILLING TEETH.*

By WM. CRENSHAW, D.D.S.

AFTER various unsuccessful efforts at arriving at "a complete system of filling teeth," the writer found it embodied in the following principles: That the highest excellence and greatest good in the treatment of approximal surfaces, is that practice which restores the anatomical feature of the tooth with the approximal, the buccal and lingual surfaces of the molars and bicuspids with natural curves, so that the teeth shall touch at approximal surfaces, producing somewhat the appearance of two eggs touching, though the effect should not be quite so pronounced ; showing a well-defined V shape space at the gum in the upper, and a Λ space in the lower.

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* Read before the Southern Dental Association, July, 1886.

For example, in a pair of bicuspids—the rounded and contoured approximal surfaces restored in natural curved lines, and touching at only *one* point. This secures not only an exemption from decay, equal to such teeth *not* decayed, but, with these surfaces rounded and contoured properly and naturally, with gold usually and preferably, and the same attention given them in cleaning, he maintains that they are safer from recurrent decay than healthy teeth ; because the rounded golden surface of the one tooth is in contact with the rounded golden surface of the other.

He gives the aids and adjuncts to this system : First, rubber dam ; secondly, separators ; third, the electric mallet.

As to the means for securing space between teeth, especially in instances where decay has eaten away the contoured points of contact, and the teeth have fallen into each other, closing, as is often seen, completely together at the cervico-approximal margins, *nothing* for this purpose approaches, even in the slightest way, Dr. Perry's (New York) new separators.

By the use of these instruments, in sets of four, we obviate opening teeth with rubber wedges, and the insufferable and unbearable soreness occasioned by these slow processes. By the use of separators, also, we avoid the casualties, in the shape of periostitis, alveolar abscess, dead nerves, etc., liable to follow the employment of wedges. Again, instead of the loose, tottery tooth, the necessary result of the slow process, with its attendant soreness, we have the teeth, as opened by the new separator, held probably ten times as firm as they were before they were touched, or standing in a natural and normal condition, and with the additional advantage of the separator holding the rubber dam securely in place and out of the way, catching the slip of instruments, etc.

The use of this separator gives us not only all the space needed in which to restore the original shape of the tooth, but in straining the teeth apart, the resulting rigidity of the tooth furnishes us, in proportion as it is made more rigid, a better resistance to the blow of the mallet. Teeth that are already loose and tender, and which cannot singly and of themselves bear the mallet, can, by the use of the separator, by being pressed into a rigid position, be comfortably and perfectly filled.

In insisting upon restoration of the original shape of the tooth, especially in approximal surfaces, of course he does not mean to be understood as restoring *only* those portions which have actually decayed away, but to remove their edges and margins ; to cut away and so shape that friable margins may be converted into strong margins, terminating in obtuse rather than acute angles. This procedure should, in teeth very much wasted away, and to a very great extent in all conditions of approximal decay, be carried to the extent of bevelling the walls of the cavity outward, rather than have them parallel, and especially rather than form undercuts down the sides of such cavities, which is to have the wall terminating in an acute angle. This treatment enables us to secure, in the first place, a much more complete and freer entrance into the remote parts of the cavity, the importance of which is great.

In the second place, we are compelled to anchor our fillings in the crown and grinding surface, and as a result, we have the strongest possible anchorage and the greatest possible strength, under the circumstances, to be had.

The writer prefers to use *only cohesive gold foil*, when gold is to be used. The foil should be employed in thin strips, and it is all important to be able to secure the best results ; as, when the mallet works well, and with the foil carefully prepared and in good trim, this instrument is capable, he thinks, of the finest work that has ever been done.

Cohesive gold admits of the widest range and use in filling teeth, and is the form most favourable to a complete system. Cohesive gold foil, then, may be said to be the only preparation with which every thing that is to be done with gold can be done.

The writer devotes much space to prove the cohesive is better than soft foil, and believes that only the former should be employed.

The writer does not think well of the matrix used with soft gold—stigmatising it as "a snare."

Passing on to the subject of mallet pressure, the writer claims that the electric mallet is the best instrument and gives the best results. It is known that the rapidity with which the blows of this instrument are delivered is in excess of that of any other mallet. He says with no other instrument, to the same extent, can gold foil be so perfectly laid over the floors of cavities, and over margins, against walls, etc. In addition to the fact that the nature of the blow is philosophically correct, it has the advantage of being peculiarly adapted to service at the most critical and inaccessible points, namely, far up or down, between the teeth where the margin of the cavity is beneath the gum, and where to permit the plugging point to slip or glance over the margin and puncture the dam, is to subject the operator to unutterable annoyance. At these most critical points the hand mallet and the automatic are risky devices. This is so because the length of stroke, particularly so of the hand and largely so of the automatic, is practically uncontrollable.

The stroke of the electric mallet, while it is yet decisive, positive and perfect, admits of being played, so to speak, over margins with perfect impunity, tearing and nipping off the overlapping gold, and thus securing a perfect joint, and margin to the filling, when, with the hand and automatic mallet, only ordinary results, as compared with those of the electric, can be obtained.

With the electric mallet in good adjustment (and everything depends on this), he believes that the finest or most perfect work can be done.

WIRE LIGATURES.

By Geo. S. Staples, Sheridan, Terax.

The writer has tried almost all kinds of clamps for the filling of buccal and labial cavities, and have never yet found *one* to give satisfaction. Recently he had a very difficult cavity on the buccal wall of second left superior bicuspid, and experienced a deal of trouble with it. After various failures, he determined to try common binding wire. The results arrived at proved highly satisfactory. He uses wire ligatures not only for buccal and labial cavities, but on all cavities that extend under the gums when not too far back for its application.

Reports of Societies.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary Monthly Meeting, November 1*st*, 1886.
CHARTERS WHITE, M.R.C.S. and L.D.S. Eng., *President, in the Chair.*

ON taking his seat, the President addressed a few words of congratulation and welcome to the assembled members on the commencement of a fresh session. He hoped all had enjoyed a pleasant vacation, and that they had returned prepared to resume work with fresh vigour. He trusted that they would afford evidence of this by entering with zest into the business of the meetings.

The Minutes of the previous meeting having been read and confirmed,

Dr. C. M. Cunningham signed the Obligation Book, and was formally admitted to membership by the President.

The following candidates were then balloted for, and elected members of the Society, viz :—

Messrs. Humphry Wingfield Tracy, L.D.S. Edin., 6, Hatter Street, Bury St. Edmunds ; Peter Crank, L.D.S. Eng., 7, Castle Street, Canterbury ; Albert J. Kutz, L.D.S.I., D.D.S., 32, Wimpole Street, Cavendish Square, W.

The President then announced that it was proposed by the Council that Mr. G. A. Ibbetson should be elected an Honorary Member. (Applause.) He felt sure that all would be pleased thus to recognise the services of an old and faithful member and one who was so well known and so highly respected. After the way in which the announcement had been received it seemed to him that it would be an empty form to send round the ballot box again, and that the resolution of the Council might well be confirmed in a more expeditious manner.

Mr. Dennant proposed that the election should take place on this occasion by show of hands.

This having been seconded by Mr. Storer Bennett, and agreed to, Mr. George Augustus Ibbetson was unanimously elected an Honorary Member.

The President said he was sorry to have to state that he had received letters from two officers of the Society, the

Treasurer and the Librarian, who regretted their inability to be present, owing to illness. Happily, both seemed to be doing well, and he hoped would soon be back in their places. He understood that Mr. Henri Weiss would announce, on behalf of his father, the additions which had been made to the Library since the last meeting.

Mr. Henri Weiss reported that no very important donations to the Library had been received during the vacation, the principal being the Calendar of the Royal College of Surgeons, and a volume of Transactions of the Smithsonian Institute.

The Curator (Mr. Storer Bennett) reported that since the last meeting of the Society, six specimens had been received for the Museum. For three of these they were indebted to Surgeon G. M. Giles, Indian Medical Service, Chitral, Kafiristan, who had forwarded a case of specimens to the Museum of the Royal College of Surgeons, and asked Mr. Stewart, the Curator, to forward to the Odontological Society the crania of two Ibices (*Capra Ibex*)—unfortunately the lower jaws were not included,—and the skull of one of the Felidæ, probably a black leopard (*Felis Pardus*).

Mr. Dunn, of Florence, had sent two very interesting specimens, viz., an upper and lower jaw, which he believed to have been found in an ancient Etruscan tomb, which would indicate their age as about 2,500 years. They were very chalky and fragile, and had apparently belonged to different individuals.

The upper jaw was rather small, and contained the incisors, canines, and bicuspids on both sides, with the first and second right molars, the tuberosity with the wisdom tooth having been broken away ; the whole of the molar region on the left side had likewise been destroyed. The teeth, which were small, showed considerable marks of wear, but no trace of caries ; some slight absorption of the alveolus round the necks of the teeth had taken place, though there was hardly a trace of tartar to be discovered. The incisors were set almost in a straight line across the face, the canines and posterior teeth, also in a straight line, being at an obtuse angle to the incisors ; thus there was no curved outline to the alveolus at all.

Unlike the upper jaw, the lower one, which consisted of the horizontal ramus, presented a well-shaped arch containing the incisors, canines, bicuspids, on both sides, with the first molar and socket of the second on the right side ; the rest of the specimen being missing. The teeth, which were considerably worn, presented the dark appearance so often seen where rapidly advancing caries has been suddenly arrested, redeposition of lime salts subsequently taking place, giving an almost enamel-like hardness to the superficial layer of dentine. The tooth had evidently been exposed to the friction engendered by an edge-to-edge bite. Absorption of the alveolus had taken place to a greater extent than in the former specimen, and there were some nodules of tartar on the roots of the teeth.

Lastly, the Society had acquired, by purchase, the skull of an African Manatee (*Manatus senegalensis*). The order *Syrenia* was thus beginning to be fairly represented in the Museum, for last session the skull of a female dugong (*Halicore dugong*) had been acquired and exhibited. The present specimen, the Senegal Manatee, differed from the American variety in possessing forty molars, whilst the latter only had thirty-six. A curious difference in the vertebral column might also be observed, for while the axis and third cervical vertebra of the American variety were freely movable on each other, in the African species these two bones were firmly anchylosed together. Although the creature had forty molars, these were never all in position at one time, the anterior ones being developed and in use before the posterior; these latter being erupted later and moving forward, the front ones being in the meanwhile extruded: a somewhat similar arrangement to that observed in the case of the elephant's molars. In the premaxillary bone two temporary incisors were developed in the Manatee, but no trace of a tooth germ was to be found in the incisor region of the lower jaw, and no premolars were developed at all.

One peculiarity of the order Syrenia consisted in the bones of the ear being placed external to the skull instead of being enclosed in an auditory bone, peculiarities which were well marked in the present specimen and in the dugong lately acquired.

The following letter from Mr. Jas. Parkinson was then read by the Secretary :—

"*Sackville Street*,
"*November* 1*st*, 1886.

"DEAR MR. SECRETARY,

"It is with very great regret and disappointment to myself that I am by illness unable to be present this evening to introduce to the notice of the Society a portrait of our old and valued friend, Mr. T. A. Rogers.

"Several of his friends felt that they could not resist an opportunity given them to procure it for the Odontological Society, and they now offer it for your kind acceptance as a small token of the great regard they entertain towards him, and the value they attach to the great services rendered by him, to the Society especially, and the profession generally, during the last thirty years.

"I feel that a convenient opportunity is also afforded me of refreshing your memory with the numerous and varied services rendered by our old friend. You will find him, at the first meeting of the Society, in November, 1856, one of your active and energetic Secretaries. This post he held until 1861, a period of great anxiety to those engaged in the formation and solicitous for the future success of the Society, and a large amount of the success attained was by his most useful and judicious co-operation. After this he continued a member of your Council, placing his experience and advice at its disposal. In 1865 he was unanimously elected President of the Society, an honour which was again accorded to him in 1881, and those who remember these periods will recollect how ably and generously he fulfilled the duties of this honourable position,

"The Odontological Society has not alone received the benefit of his valuable services. On the establishment of the Dental Hospital and School, offsprings of this Society, first in Soho Square and afterwards in this building, you will find him hard at work in assisting their development, and afterwards becoming Dean of the School, a most important office, There must be many present in this room who can remember and appreciate his genial manner, his kind and sound advice, and his encouragement to all those seeking it. I could add much more in enumerating his services were it necessary, but these are so well known to the members of the profession that I refrain.

"Trusting that you will receive this addition to your walls with a hearty welcome,

"Believe me, sincerely yours,

"David Hepburn, Esq." "JAS. PARKINSON.

The Portrait, which, like those of Mr. J. Tomes and Mr. Parkinson, lately presented to the Society, is by Mr. Macartney, and a very satisfactory likeness, was then uncovered.

The President replied that it was unnecessary for him to say more than that he accepted the picture on behalf of the

Society as a welcome addition to its collection. No one who had known Mr. Arnold Rogers could look at this portrait without being reminded of his amiability and warm-heartedness, his dignity of character, and his constant desire to further the interests of the Society. In its name he thanked the donors most heartily for their valuable and acceptable present.

Dr. St. George Elliott read the following letter from Dr. Taft, President of the Section of Dental and Oral Surgery of the International Medical Congress of 1887, and intimated that he should be glad to receive the names of any members of the profession who might be disposed to comply with Dr. Taft's request.

"*Cincinnati, Ohio, U.S.A.*,
"*October 5th*, 1886.

"My Dear Sir,

"We desire at the earliest possible moment to ascertain who will prepare papers and work for the Section on Dental and Oral Surgery of the International Medical Congress to be held next year.

"Will you give me the names of fifteen to twenty dentists in Great Britain and Ireland, who could and would be willing to prepare papers for the Section?

"Preparations are being made for a very extensive and complete presentation of clinical and prosthetic work. The aim is to arrange for ten to twelve operating chairs, which may be used by the best operators of each country, and thereby have all the various methods presented by the best skill in the world. Benches, lathes, furnaces, &c., will be furnished for the use of the best skill that can be found in Prosthetic Dentistry. Thus will be demonstrated all the various methods of constructing and inserting artificial substitutes.

"Facilities will also be made for various branches of scientific work, microscopical and histological, with illustrations of the most perfect kind. Operations upon and treatment of exposed pulps, diseased gums, and other soft tissues of the mouth will be performed by the best ability extant.

"Thus you see the plan is devised for large things. I trust that the meetings will be so arranged that sufficient time will be afforded for the profitable carrying out of this scheme.

"The clinics and practical work will be conducted in the best possible adapted rooms to be obtained in the vicinity of the hall in which the meetings of the Section will be held.

"This will give you an idea of the contemplated work of the Dental Section. Please give me your suggestions at your earliest convenience.

"Yours very truly,
"Dr. W. St. George Elliott." "J. TAFT.

Dr. Elliott added that he would take that opportunity of making another announcement, which might be of interest to some of the younger members of the profession, and to those who were preparing to enter it. The only American dental degrees recognised in England, and therefore of value to English practitioners, were those of Harvard and Michigan Universities. Both of these bodies required all candidates to pass an examination in general knowledge, and it was found that this was sometimes an obstacle in the case of those who had devoted several years to the acquisition of professional knowledge. To obviate this the University of Michigan had determined to hold its preliminary examinations at various centres in this and other countries, so that students at a distance, who thought of trying for its dental degree, might have an opportunity of passing the examination in general knowledge before they entered upon their professional studies.

The President remarked that he hoped Dr. Taft's letter would meet with a ready response from members of the Society.

At the close of the meeting Mr. H. C. Walter showed and explained the action of Tauber's Hydraulic Press for swaging plates, which he claimed to be a great advance on all previous attempts in this direction. The demonstration, which was continued after the close of the meeting, was watched with great interest.

On the motion of the President, a vote of thanks was given to Messrs. Storer Bennett, Charles Tomes, Hutchinson, and other contributors of specimens and communications during the evening.

The Society then adjourned.

ODONTOLOGICAL SOCIETY OF VICTORIA.

THE ordinary monthly meeting of the Odontological Society was held on Thursday, Sept. 2nd, Mr. Cummings, President, in the chair. There was a good attendance of members.

Messrs. L. A. Carter, D.D.S., and F. G. Holloway were elected members.

Mr. Down exhibited the model of a case in which the superior canine on the left side, was placed anterior to the temporary canine, and no lateral had been erupted; on the right side the temporary canine was in its usual place, and the permanent canine was situated external to, and between the two bicuspids. The patient is thirty years of age. The other teeth are normal. Mr. Thompson exhibited several abnormal teeth.

Mr. Iliffe read a paper on "Articulation," and exhibited an improvement he had devised on the Graham and Wood frame. Mr. Kernot read a paper on "Gold consolidators," reviewing the merits of the various mallets in use.

Votes of thanks were passed to Messrs. Iliffe and Kernot for the papers they had read, and the meeting adjourned.

GEORGE THOMSON, L.D.S.
Hon. Sec.

ODONTOLOGICAL SOCIETY OF VICTORIA.

The ordinary monthly meeting of the Odontological Society of Victoria was held on Thursday, Oct. 7th. There was a good attendance. It was announced that the Dental Bill had not yet passed the second reading.

Mr. McIntyre exhibited some abnormal teeth.

Mr. Cummings read a lengthy and humorous paper on "Ancient Dentistry, historical and anecdotal."

A vote of thanks was passed to Mr. Cumming for his interesting paper.

GEORGE THOMSON, L.D.S.,
Hon. Sec.

Erratum.—In the journal of Sept. 1st. the name of J. R. Gurner, L.D.S., of Adelaide, is spelt "Gnoner."

Dental News.

ODONTO-CHIRURGICAL SOCIETY.

The Second Ordinary Meeting of the Odonto-Chirurgical Society (Session 1886-87) was held in the Rooms, 30, Chambers Street, Edinburgh, on Thursday, 9th December,at 8 p.m. —W. Bowman Macleod, L.D.S., President, in the Chair.

Private Business : Nominations.

General Business : Discussion upon the causes and treatment of Pyorrhea Alveolaris, to be opened by W. Bowman Macleod, L.D.S.

JOHN S. AMOORE, *Hon. Sec.*

P.S.—Owing to a delay in the preparation of some woodcuts, it has been impossible to issue last month's Transactions in time for this meeting.

HOSPITAL REPORTS.

MONTHLY STATEMENT of operations performed at the National Dental Hospital, from Nov. 1 to Nov. 30, 1886 :—

Number of Patients attended		2777
Extractions	Children under 14	473
	Adults	718
	Under Nitrous Oxide	702
Gold Stoppings...		70
Other Stoppings		744
Advice and Scaling		335
Irregularities of the Teeth		239
Miscellaneous		169
Total		3450

ISIDORE FREDK. PRAGER, L.D.S.
House Surgeon.

MONTHLY STATEMENT of operations performed at the Birmingham Dental Hospital, from Nov. 1 to Nov. 30, 1886 :—

Number of Patients attended		1089
Extractions	Children under 14	
	Adults	963
	Under Nitrous Oxide Anæsthetic	26
Gold Stoppings		7
Other Stoppings		76
Advice and Scaling		90
Irregularities of the Teeth		4
Miscellaneous		50
Total		2305

VACANCY.

NATIONAL Dental Hospital, 149, Great Portland Street, W. The post of House Surgeon is vacant. Applications on or before the 20th December.

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